Lying in Hospital

THE MEDICAL AND CHIRURGICAL REVIEW;

CONTAINING

A COPIOUS ACCOUNT

OF

VARIOUS PUBLICATIONS,

In different Languages,

ON

MEDICINE AND SURGERY.

TOGETHER WITH

A Variety of Miscellaneous Information

RELATING TO THE

DIFFERENT BRANCHES OF MEDICINE,

And the Sciences connected therewith.

---------------- QUÆ NON FECIMUS IPSI

VIX EA NOSTRA VOCO------------------ Ovid.

VOL. VII.

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PREFACE.

SEVEN years have now elapsed since the first publication of the *Medical and Chirurgical Review*, a period within which many important innovations have been made, both in the doctrines and practice of medicine. Of these it has been our aim to exhibit, from time to time, a clear and connected view; endeavouring thereby to furnish practitioners remote from the centre of publication, and such whose avocations forbid an extensive perusal of authors, with the most useful and leading points, and a general knowledge of what is passing in the medical world.

Criticism we have always considered as a minor object, and which, if indulged in, would infallibly lead to the neglect of matters more useful. Discussions of this nature are too apt to end in mere personal invective, and, after all, can be considered only as conveying the sentiments of an individual. The general merit of a work can easily be collected from the analysis, without invidiously pointing out every objectionable passage.

We are happy to find that the *Miscellaneous* part of our Work has been well received, The variety we have thus been able to introduce, culled from different sources, has, we trust, increased the interest, as it has the utility, of the undertaking. With respect to the admission of original cases and observations, to which we have been often urged, we must observe, that it is neither consistent with our original plan, nor with the extent of the Work itself. Brief literary notices of works in hand, and the like, we shall be always glad to be furnished with.

We have now the most unpleasant part of our task to perform, but which circumstances have rendered indispensable----the announcing the absolute necessity we are under of advancing the price of the future Numbers of this Work. For seven years that the *Medical and Chirurgical Review* has existed, no advance in its price has been made; yet within this period the charges of printing and materials have increased in an enormous degree. Three years ago, an advance took place on paper equal to 30 per cent.; within the last twelve months, a further advance has been made, which, exclusive of the increased wages of labour, scarcely amounts to less. Whilst these circumstances have compelled publishers, without exception, to increase their prices, that of the *Medical and Chirurgical Review* has hitherto remained unaltered, in the hope that the pressure was temporary, and that things would shortly resume their former footing. Unfortunately, all hope of this has now vanished, and the Publisher is compelled, in justice to himself, to follow the general example. Soon after the commencement of the Work, it was suggested that we gave too scanty a quantity of letter-press: this was immediately attended to, and the number of pages augmented from eighty-four to an hundred, together with a considerably enlarged page, and a closer style of printing. In *our* turn, we now claim the indulgence of our Readers; the reasonableness of our request has, we trust, been made apparent. Henceforward, therefore, the price of the *Medical and Chirurgical Review* will be *Two Shillings* each Number, and the Publication will continue, as usual, every *other* Month. The present and former Numbers will continue to be sold at the original price.---We have thought it right to defer the notice now given to the conclusion of a Volume, lest it had been said an unfair advantage was taken of the Reader.

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No. XXXVII.

THE MEDICAL AND CHIRURGICAL REVIEW.

JULY, 1800.

Art. I. *Philoſophical Tranſactions of the Royal Society of London for the Year* 1799. Part II. London, 1799. Elmsley.

THE firſt article, in the preſent valuable collection, is entitled,—*An Account of the Diſſection of an Hermaphrodite Dog. To which are prefixed, ſome Obſervations on Hermaphrodites in general: by* Everard Home, Eſq. F.R.S.—Inſtances of animals being brought forth, whoſe organs of generation are preternaturally formed, not unfrequently occur, and have been commonly, but improperly, called hermaphrodites: this term, Mr. Home obſerves, ſhould be confined to thoſe only in which there is a mixture of the male and female organs in the ſame animal. But examples of this kind have been rarely noticed; they have been met with at very diſtant periods of time, and confined to too few ſpecies of animals, to afford extenſive opportunities for collecting obſervations reſpecting them.

Monſtrous productions, having a mixture of the male and female organs, and which deſerve the name of

of hermaphrodites, appear to arise most frequently in neat cattle: they are now generally known, and have been called *free-martins.* This compound animal attracted the attention of the late Mr. Hunter; a paper of his, containing a description of the organs of generation of different free-martins, to shew that they are by no means uniformly the same, or partake equally of the parts belonging to both sexes, was published in the Philosophical Transactions, vol. 69. The intention of the present paper is, to give an account of a similar formation of the organs of generation in a dog.

This animal had no appearance of teats, or glands of the breast, differing, in this respect, both from male and female. The clitoris was very large, and the orifice of the meatus urinarius was also unusually large, as if it was intended for a common passage to the bladder and vagina. Internally, in the situation of the ovaria, were two imperfectly-formed small testicles, distinguished to be such by the convolutions of the spermatic artery; from these passed down an impervious chord, or vas deferens, not thicker than a thread, to the posterior part of the bladder, where they united into one substance, which was nearly two inches long, and terminated behind the meatus urinarius. When the testicles were cut into, they appeared to have no regular glandular structure.

In this animal the clitoris was the only part of the female organs that was completely formed. What rendered the parts a decided mixture of male and female organs, was, the testes being in the place appropriated for the ovaria, and the ligamentous substance, to which the vasa deferentia were connected, somewhat resembling an imperfect vagina. The clitoris, in this instance, could not be considered as an imperfect penis, since the bone, the distinguishing mark of the dog's penis, was wanting.

Mr. Home explains, at some length, the different kinds of monstrous production which have been frequently

quently miſtaken for a complete mixture of male and female organs; examining ſuch mal-formations in the different ſexes as have led to the belief of the perſons being hermaphrodites; and, likewiſe, ſuch in males as, from a deficiency in their organs, have not the character and general properties of the male, and may be called neuters. Without following the author in his detail, which our limits forbid, we ſhall ſelect a few of the moſt ſtriking inſtances adduced by him on the ſubject.

A caſe is related where, though the canal of the urethra was continued to the external orifice at the glans penis, the deficiency of the urethra behind the ſcrotum was ſo great, that every attempt to cloſe the aperture, neceſſarily left in perinæo, proved ineffectual; and, under theſe circumſtances, the perſon married. When he had connexion, the emiſſion was complete, which proved that the teſticles were perfect; but the ſemen always paſſed out at the perinæum. The late Mr. Hunter was conſulted, to remedy, if poſſible, this inconvenience, and enable the perſon to beget children. After the failure of ſeveral modes of treatment, Mr. Hunter ſuggeſted the following experiment. He adviſed that the huſband ſhould be prepared with a ſyringe fitted for the purpoſe, previouſly warmed, and that, immediately after the emiſſion had taken place, it ſhould be taken up by the ſyringe, and injected into the vagina, while the female organs were ſtill under the influence of the coitus, and in the proper ſtate for receiving the ſemen. This experiment was actually made, and the wife proved with child. Upon a ſubject of this kind, Mr. Home obſerves, it is proper to ſpeak with caution; but, from all the attending circumſtances, no doubt was entertained by Mr. Hunter, or the huſband, that the impregnation was entirely the effect of the experiment.—Spallanzani's experiments on this ſubject, upon animals, were made ſeveral years after

this propoſal of Mr. Hunter's had been attended with ſucceſs.

Some inſtances of enlarged clitoris are next mentioned, affording an imperfect reſemblance to the male organs: as is alſo a caſe of prolapſed uterus, where the appearances greatly reſembled that of the penis in the male.

'The following inſtances of children with male organs having remained neuters, in conſequence of the teſtes being imperfectly formed, and incapable of producing that influence on the conſtitution which ſtamps it with the character of the ſex, have come under my own obſervation.

'A marine ſoldier, aged twenty-three, in the year 1779, was admitted a patient into the Royal Navy Hoſpital at Plymouth, under my care. He had been there only a few days, when a ſuſpicion aroſe of his being a woman, which induced me to examine into the circumſtances. He proved to have no beard; his breaſts were full as large as thoſe of a woman at that age; he was inclined to be corpulent; his ſkin uncommonly ſoft, for a man; his hands fat and ſhort; his thighs and legs very much like thoſe of a woman; the quantity of fat upon the os pubis reſembled the mons veneris; the penis was unuſually ſmall, as well as ſhort, and not liable to erections; the teſticles not larger in ſize than we commonly find them in the fœtal ſtate; and he had never felt any paſſion for women.

'In this caſe the teſticles had been imperfectly formed, and the conſtitution was deprived of that influence which it naturally receives from them. In addition to this imperfection in the organs of generation, he was weak in his intellects, and in his bodily ſtrength.

'The two following caſes ſhew a ſtill greater degree of imperfection in the male organs.

'A woman, near Modbury in Devonſhire, the wife of a day labourer, had three children: the firſt was

was conſidered to be an hermaphrodite, the ſecond was a perfectly-formed girl, and the third an hermaphrodite, ſimilar to the firſt. Having heard this account, I viſited the cottage, in the year 1779, and made the following obſervations upon the imperfectly-formed children.

'The eldeſt was thirteen years of age, of a moſt uncommon bulk, which appeared to be almoſt wholly compoſed of fat; his body, round the waiſt, was equal to that of a fat man, and his thighs and legs in proportion; he was four feet high; his breaſts as thoſe of a fat woman; the mons veneris loaded with fat; no penis; a preputium one ſixth of an inch long; and under it the meatus urinarius, but no vagina. There was an imperfect ſcrotum, with a ſmooth ſurface, without a rapha in the middle, but, in its place, an indented line; it contained two teſticles, of the ſize they are met with in the fœtus. He was very dull and heavy, almoſt an idiot, but could walk and talk: he began to walk at a year and a half old.

'The younger one was ſix years old, uncommonly fat, and large for its age; more an idiot than the other, not having ſenſe enough to walk, although his limbs were not defective. The external parts of generation differed in nothing from thoſe juſt deſcribed, except in the prepuce being an inch long. He had a ſupernumerary finger on each hand, and a ſupernumerary toe on each foot.

'It is curious, that the mother of theſe two children, ſo like in their imperfections, ſhould have had a perfectly-formed child between them; and it leads me to mention, that the Poliſh Dwarf, Count Boruwlaſki, who was in England in 1786, ſtated, that in his family the children had been alternately dwarfs, of which there were two, him, and his ſiſter, the intermediate child having grown to the common ſize.'

2. *An Inquiry concerning the Weight ascribed to Heat: by* Benjamin, Count of Rumford, F R.S. &c. —The various experiments which have been hitherto made with a view to determine the question so long agitated, relative to the weight which has been supposed to be gained, or to be lost, by bodies, upon their being heated, are of a nature so very delicate, and are liable to so many errors, not only on account of the imperfections of the instruments made use of, but also of those, much more difficult to appreciate, arising from the vertical currents in the atmosphere, caused by the hot or the cold body which is placed in the balance, that it is not at all surprizing that opinions have been so much divided, relative to a fact so very difficult to ascertain.

The learned author of the present Inquiry here relates the result of his experiments on the subject, made with all possible accuracy, and with all those precautions to avoid errors, which a knowledge of the various sources of them could inspire. The construction of the balance employed by him was so extremely nice, that had only the *one millionth* part of the weight of the substances used been gained or lost, he would certainly have discovered it. After much labour, and many trials, he is led to adopt the conclusion,—that heat has no *measurable* effect on the weight of bodies; that water does not acquire or lose any weight, upon being changed from a state of *fluidity* to that of *ice*, and *vice versa*. The experiments here related have fully convinced the author, that if heat be in fact a *substance*, or matter—a fluid *sui generis*, as has been supposed, but of which, as we have before seen, he entertains doubts,—which, passing from one body to another, and being accumulated, is the immediate cause of the phenomena we observe in heated bodies, it must be something so infinitely rare, even in its most condensed state, as to baffle all our attempts to discover its gravity.

'Water,

‘ Water, upon being frozen, has been found to lofe a quantity of heat amounting to 140 degrees of Fahrenheit’s thermometer, or, which is the fame thing,—the heat which a given quantity of water, previoufly cooled to the temperature of freezing, actually lofes, upon being changed to ice, if it were to be imbibed and retained by an equal quantity of water, at the given temperature (that of freezing), would heat it 140 degrees, or would raife it to the temperature of (32° + 140°) 162° of Fahrenheit’s thermometer, which is only 60° fhort of that of boiling water; confequently, any given quantity of water, at the temperature of freezing, upon being actually frozen, lofes almoft as much heat as, added to it, would be fufficient to make it boil.

‘ It is clear, therefore, that the difference in the quantities of heat contained by the water in its fluid ftate, and heated to the temperature of 61° F. and by the ice, in the experiments before-mentioned, was at leaft nearly equal to that between water in a ftate of boiling, and the fame at the temperature of freezing.

‘ But this quantity of heat will appear much more confiderable, when we confider the great capacity of water to contain heat, and the great apparent effect which the heat that water lofes upon being frozen would produce, were it to be imbibed by, or communicated to, any body whofe power of receiving and retaining heat is much lefs.

‘ The capacity of water to receive and retain heat, —or what has been called its fpecific quantity of latent heat,—has been found to be to that of gold as 1,000 to 50, or as 20 to 1; confequently, the heat which any given quantity of water lofes upon being frozen, were it to be communicated to an equal weight of gold, at the temperature of freezing, the gold, inftead of being heated 162 degrees, would be heated 140 × 20 = 2800 degrees, or would be raifed to a *bright red heat.*

'It appears, therefore, to be clearly proved, by my experiments, that a quantity of heat equal to that which 4214 grains (or about 9¼ oz.) of gold would require to heat it from the temperature of freezing water to be *red hot*, has no sensible effect upon a balance capable of indicating so small a variation of weight as that of $\frac{1}{1000000}$ part of the body in question; and if the weight of gold is neither augmented nor lessened by *one millionth part*, upon being heated from the point of *freezing water* to that of a *bright red heat*, I think we may very safely conclude, *that all attempts to discover any effect of heat upon the apparent weights of bodies will be fruitless.*

3. *An Account of some Experiments on the Fecundation of Vegetables: by* Thomas Andrew Knight, Esq.—The breeders of animals have long entertained an opinion, and which appears to be well founded, that considerable advantages are obtained by breeding from males and females not related to each other; animals being found to degenerate, in size, at least, on the same pastures, and in other respects under the same management, when this process of crossing the breed is neglected. The close analogy that subsists between the animal and vegetable world, the sexual system equally pervading both, naturally lead to the supposition, that similar means might be productive of similar effects in each; and the very curious experiments of Mr. Knight, here brought forward, confirm the opinion.

Having opened the immature blossoms of the common white pea, he destroyed the male parts, taking great care not to injure the female ones; and, a few days afterwards, when the blossoms appeared mature, he introduced the farina of a very large and luxuriant gray pea into one half of the blossoms, leaving the other half as they were. The pods of each grew equally well; but it was soon perceived that in those into whose blossoms the farina had not been introduced,

duced, the feeds remained nearly as they were before the bloffoms expanded, and in that ftate they withered. Thofe in the other pods attained maturity, but were not in any fenfible degree different from thofe afforded by other plants of the fame variety; owing, the author imagines, to the external covering of the feed being furnifhed entirely by the female. In the fucceeding fpring, however, the difference became extremely obvious; for the plants from them rofe with exceffive luxuriance, and the colour of their leaves and ftems clearly indicated, that they had all exchanged their whitenefs for the colour of the male parent: the feeds produced in autumn were dark gray. By introducing the farina of another white variety (or, in fome inftances, by fimple culture), this colour was eafily difcharged, and a numerous variety of new kinds produced, many of which were, in fize, and in every other refpect, much fuperior to the original white kind, and grew with exceffive luxuriance, fome of them attaining the height of more than twelve feet. The quantity of farina introduced did not feem at all to influence the effects.

In other cafes, by mixing the farina of different varieties, the feeds produced indicated, in many refpects, a common parentage, thus ftill more clofely imitating the procefs of generation in animals.

Experiments of the like kind to thofe above defcribed were made on the bloffoms of *wheat*, but not with equal fuccefs. As many varieties as were wifhed were obtained by merely fowing the different kinds together; for the ftructure of the bloffom of this plant (unlike that of the pea) freely admits the ingrefs of adventitious farina, and is thence very liable to fport in varieties. Some of thofe obtained were excellent; others very bad; and none of them permanent. By feparating the beft varieties, a moft abundant crop was produced; but its quality was not quite equal to the quantity, and all the difcarded varieties again made their appearance.—With the apple,

apple, the grape, and many other plants, the author was more succefsful: and his experiments all tended to evince, that improved varieties of every fruit and efculent plant may be obtained by this procefs.

The importance of the inquiry here begun, is obvious; fince it is highly probable, that amongft the varieties thus obtained, many will be found better calculated to correct the defects of different foils and fituations, than any we have at prefent, which, for the moft part, are the produce of accident merely.

5. *Obfervations on the different Species of Afiatic Elephants, and their Mode of Dentition: by* John Corfe, Efq.

6. *Some Obfervations on the Structure of the Teeth of Graminivorous Quadrupeds; particularly thofe of the Elephant and Sus Æthiopicus: by* Everard Home, Efq. F.R.S.—This paper may be confidered as fupplementary to the preceding: its object is to explain the ftructure of the elephant's teeth, and to point out the general principle upon which all teeth are formed that have the enamel intermixed with the fubftance of the teeth, which is the cafe, in a certain degree, of all truly graminivorous quadrupeds. The inquiry is profecuted with much minutenefs, in which, however, we cannot follow the ingenious author, nor if we did fhould we be readily underftood without the affiftance of the engravings.

The teeth of carnivorous animals, Mr. Home obferves, are formed from a vafcular pulp, of the fame fhape with the future tooth, upon the external furface of which the fubftance of the tooth begins to grow, and increafes till it is completely formed. This pulp is inclofed by a capfule, the cavity of which, while the tooth is growing, is filled with a vifcid fluid, fimilar to the fynovia of joints; and this fluid, by the abforption of the thinner parts, becomes infpiffated to a proper ftate for cryftallization, fo as to

form

form the enamel, which adheres to the ſurface of the tooth. Teeth formed in this way are compoſed of two parts, of diſſimilar texture: one, the enamel, which is ſtriated; the other, the ſubſtance of the tooth, which is laminated, like ivory, being more compact than common bone, and leſs ſo than the enamel, but differing from both in the mode of its formation. The ſubſtance of the teeth, therefore, muſt be conſidered as diſtinct from bone, and as a ſpecies of ivory. The tuſks of the elephant are formed upon a pulp, ſimilar to teeth.

The teeth of the elephant differ from thoſe juſt deſcribed, in being compoſed of a great many flattened oval proceſſes; theſe, while growing, are detached, but, when completely formed, their baſes unite together, and make the body of the tooth, to which the fangs are afterwards added; and, as the fangs are lengthened, the tooth riſes in the jaw. This is what may be conſidered as the tooth itſelf, being compoſed of the ſame materials as the teeth of carnivorous animals; but, in addition, there is another ſubſtance, which unites all the ſubſtances together, laterally, into one maſs; this is ſofter than the ſubſtance of the tooth, and, upon examination, proves to be ſimilar, in its texture and formation, to common bone.

There is another peculiarity, reſpecting the teeth of the elephant, and which has not been found in any other animal, excepting the *ſus æthiopicus;* which is, that the whole number of grinding teeth belonging to each ſide of the jaw is confined in a caſe of bone, ſo as to form one large grinding ſurface; and the teeth are puſhed forward from behind, inſtead of a ſecond ſet being formed immediately under the fangs of the firſt, as in other animals. Thus it appears that an elephant can never ſhed his teeth in the manner of other animals. The anterior layers of the grinders are gradually worn down by uſe, when the fangs and alveolar proceſſes begin to be abſorbed. Their places are gradually ſupplied by the next laminæ

minæ of the grinder and their fangs coming forward in a constant succession.

7. *Experiments to determine the Quantity of Tanning Principle and Gallic Acid contained in the Bark of various Trees: by* George Biggin, Esq.—An abstract of this article will be found in the Miscellaneous part of our present Number.

8. *Essay on the Resolution of Algebraic Equations: attempting to distinguish particularly the real Principle of every Method, and the true Causes of the Limitations to which it is subject: by* Giffin Wilson, Esq.

9. *On different Sorts of Lime used in Agriculture: by* Smithson Tennant, Esq. F.R.S.—This subject was noticed in our last Number.

10. *Experiments and Observations on Shell and Bone: by* Charles Hatchett, Esq. F.R.S.—There is no part of the structure or composition of animals, the nature of which it is not desirable to be intimately acquainted with; as there is no fact regarding animal life, which, at the same time that it elucidates the general economy, may not, more or less directly, throw some light on the nature and removal of disease. The subject of the present essay has been less attended to than might have been expected, considering the rank that substances of this kind have, for ages, held in the *materia medica*. On this account, we shall follow the very ingenious author in his train of experiments with some degree of minuteness. The following is the mode of proceeding which was adopted in the inquiry.

When shells were examined, they were immersed in acetous acid, or nitric acid, diluted, according to circumstances, with four, five, six, or more parts, of distilled water, and the solution was always made without heat.

The carbonate of lime was precipitated by the carbonate of ammoniac, or of potash; and phosphate of lime

lime (if present) was previously precipitated by pure or caustic ammoniac.

If any other phosphate, like that of soda, was suspected, it was discovered by solution of acetite of lead.

Bones and teeth were also subjected to the action of the acetous, or diluted and muriatic acids.

The dissolved portion was examined by the above-mentioned precipitants; and, in experiments where the quantity of the substance would permit, the phosphoric acid was also separated by nitric or sulphuric acid. The phosphoric acid thus obtained was proved after concentration by experiments, which, being usually employed for such purposes, are too well known to require description.

The greater part, Mr. Hatchett observes, if not all, of marine shells, appear to be of two descriptions, in respect to the substance of which they are composed: those of a *porcellaneous* aspect with an enamelled surface, and which, when broken, are often, in a slight degree, of a fibrous texture: of this kind are various species of *voluta*, *cypræa*, &c. The second species have generally, if not always, a strong epidermis, under which is the shell, composed principally, or entirely, of the substance called *nacre*, or mother-of-pearl: such are the *oyster*, the *river-muscle*, the *haliotris iris*, &c.

'*Experiments on Porcellaneous Shells.*—Shells of this description, when exposed to a red heat in a crucible, during about a quarter of an hour, crackled, and lost the colours of their enamelled surface; they did not emit any apparent smoke, nor any smell like that of burnt horn or cartilage. Their figure remained unchanged, excepting a few flaws; and they became of an opaque white, tinged particularly with pale gray, but retained part of their original gloss. The shells which had not been exposed to fire (whether intire or in powder), dissolved with great effervescence in the various acids, and the solution after-

afterwards remained colourleſs and tranſparent. But the ſhells which had been burned, upon being diſſolved, depoſited a very ſmall quantity of animal coal, and thereby the preſence of ſome gluten was denoted, although the proportion was too ſmall to be diſcovered in the ſolution of the ſhells which had not been burned. The various ſolutions were filtrated, and were examined by pure ammoniac and acetite of lead; but I never obtained any trace of phoſphate of lime, nor of any other combination of phoſphoric acid. The carbonate of lime was afterwards precipitated by carbonate of ammoniac, and from many experiments it appeared, that porcellaneous ſhells conſiſt of carbonate of lime, cemented by a very ſmall portion of animal gluten.'

Some *patellæ* from Madeira were found to contain a larger portion of a more viſcid gelatinous ſubſtance than thoſe above-mentioned; but their ſolution, ſeparated from the gelatinous ſubſtance, afforded nothing but carbonate of lime.

'*Experiments on Shells compoſed of Nacre, or Mother-of-pearl.*—When the ſhell of the common oyſter was expoſed to a red heat, the effects were the ſame as thoſe obſerved in the patellæ; and the ſolution of the unburned ſhell was ſimilar, only the gelatinous part was rather of a greater conſiſtency.

'A ſpecies of the river-muſcle was next ſubjected to experiment: this, when burned in a crucible, emitted much ſmoke, with a ſtrong ſmell of burned cartilage, or horn; the ſhell throughout became of a dark gray, and exfoliated. By ſolution in the acids a large quantity of carbonic matter was ſeparated; and much leſs of carbonate of lime was obtained from a given weight of the ſhell, than from thoſe already mentioned.

'Upon immerſing an unburned ſhell in dilute nitric acid, a rapid ſolution and efferveſcence at firſt took place, but gradually became leſs, ſo that the diſengagement

gagement of the carbonic acid gas was to be perceived only at intervals.

'At the end of two days I found nearly the whole of the carbonate of lime diſſolved; but a ſeries of membranes, retaining the figure of the ſhell, remained, of which the epidermis conſtituted the firſt.

'In the beginning, the carbonate of lime was readily diſſolved, becauſe the acid menſtruum had an eaſy acceſs; but, after this, it had more difficulty to inſinuate itſelf between the different membranes, and, of courſe, the ſolution of the carbonate of lime was ſlower.

'During the ſolution, the carbonic acid gas was entangled, and retained in many places between the membrane, ſo as to give to the whole a cellular appearance.

'The *haliotis iris*, and the *turbo olearius*, reſembled this muſcle, excepting that their membranaceous parts were more compact and denſe.

'Theſe ſhells, when deprived, by an acid menſtruum, of their hardening ſubſtance, or carbonate of lime, appear to be formed of various membranes, applied *ſtratum ſuper ſtratum*.

'Each membrane has a correſponding coat or cruſt of carbonate of lime, which is ſo ſituated, that it is always between every two membranes, beginning with the epidermis, and ending with the laſt formed internal membrane.

'The animals which inhabit theſe ſtratified ſhells increaſe their habitation by the addition of a ſtratum of carbonate of lime, ſecured by a new membrane; and, as every additional ſtratum exceeds in extent that which was previouſly formed, the ſhell becomes ſtronger in proportion as it is enlarged, and the growth and age of the animal becomes denoted by the number of the ſtrata which concur to form the ſhell.

'Although the *haliotis iris*, and the *turbo olearius*, are compoſed of the true mother-of-pearl, I was induced

duced to repeat the foregoing experiments on some detached pieces of mother-of-pearl, such as are brought from China. These experiments I need not describe, as the results were precisely the same.'—Pearls themselves appeared to be similar in composition to the mother-of pearl from which they were taken.

'When the experiments on the porcellaneous shells, and on those formed of mother-of-pearl, are compared, it appears, that the porcellaneous shells are composed of carbonate of lime, cemented by a small portion of gluten; and that mother-of-pearl, and pearl, do not differ from these, except by a smaller proportion of carbonate of lime, which, instead of being simply cemented by animal gluten, is intermixed with, and serves to harden, a membranaceous or cartilaginous substance; and this substance, even when deprived of the carbonate of lime, still retains the figure of the shell.

'But, between these extremes there will, probably, be found many gradations; and these we have the greater reason to expect, from the example afforded by the patellæ, which have been lately mentioned.

'Some few experiments were made on certain land-shells, and, in the common garden-snail, I thought that I discovered some traces of phosphate of lime; but, as I did not find any in the *helix nemoralis*, it may be doubted whether the presence of phosphate of lime should be considered as a chemical character of land-shells.'

The next experiments were made on the covering substance of crustaceous marine animals. Different species of *echini* were first examined.*—'Portions of these were separately immersed in acetous, muriatic, and diluted nitric acid, by each of which they were completely dissolved, with much effervescence,

* *Echinus.* Corpus subrotundum, *crusta ossea tectum*, spinis mobilibus sæpius aspera.—Lin. *Syst. Nat.*

deposit-

depositing, at the same time, a thin outer skin, or epidermis. The transparency of the solutions was also disturbed by a portion of gluten, which remained suspended, and communicated a brownish colour to the liquors.

'The solutions in acetous and diluted nitric acid were filtrated; after which, from the acetous solution of each echinus, I obtained a precipitate of phosphate of lead, by the addition of acetite of lead; and, having thus proved the presence of phosphoric acid, I saturated the nitric solutions with pure ammoniac, by which a quantity of phosphate of lime was obtained, much inferior, however, in quantity, to the carbonate of lime, which was afterwards precipitated by carbonate of ammoniac.

'The composition of the crust of the echinus is, therefore, different from that of marine shells; and, by the relative proportions and nature of the ingredients, it approaches most nearly to the shells of eggs of birds, which, in like manner, consist of carbonate, with a small portion of phosphate of lime, cemented by gluten.'

It was now requisite to examine the composition of those substances which are decidedly called crustaceous, as the shell of the crab, lobster, prawn, and cray-fish.

'Pieces of this substance, taken from various parts of those animals, was, at different times, immersed in acetous, and in diluted nitric acid; those which had been placed in the diluted nitric acid produced a moderate effervescence, and, in a short time, were found to be soft and elastic, of a yellowish-white colour, and like a cartilage, which retained the original figure.

'The same effects were produced by acetous acid, but in a less degree; in the latter case, also, the colouring matter remained, and was soluble in alcohol.

 'All

'All the solutions, both acetous and nitric, afforded carbonate and phosphate of lime, although the former was in the largest proportion.

'There is reason to conclude, therefore, that phosphate of lime, mingled with the carbonate, is a chemical characteristic which distinguishes the crustaceous from the testaceous substances; and that the principal difference in the qualities of each, when complete, is caused by the proportion of the hardening substances, relative to the gluten by which they are cemented; or by the abundance and consistency of the gelatinous, membranaceous, or cartilaginous substance, in, and on which the carbonate of lime, or the mixture of carbonate and phosphate of lime, has been secreted and deposited.

'Moreover, as the presence of phosphate of lime, mingled with carbonate, appears to be a chemical character of crustaceous marine animals, there is every reason to conclude, that Linnæus did right not to place the echini among the testaceous ones.

'The presence of phosphate of lime, in the substance which covers the crustaceous marine animals, appears to denote an approximation to the nature of bone, which, not only by the experiments of Mr. Gahn, but by the united testimony of all chemists, has been proved principally to consist (as far as the ossifying substance is concerned) of phosphate of lime.

'This consideration, therefore, induced me to repeat the above experiments on bones of various animals.

'It is scarcely necessary for me to mention the usual effects of acids on bones steeped in them, as they are known to every physiologist and anatomist.

'In every operation of this nature, the ossifying substance, which is principally phosphate of lime, is dissolved, and a cartilage or membrane, of the figure of the original bone, remains; so that the first origin of bones appears to be by the formation of a membrane or cartilage, of the requisite figure, which, when

when the subsequent secretion of the ossifying substance takes place, is penetrated by, and thus becomes more or less converted into, the state of bone.

'It is also known, that the nature of bone is more influenced by the greater or less predominance of the membranaceous or cartilaginous part, than by any other cause. It is not, therefore, for me to add any thing to this part; and, in respect to the substance which is the cause of ossification, little also requires to be mentioned; for this (as already has been observed) is known principally to consist of phosphate of lime. I shall only, therefore, briefly mention the result of certain experiments.'

The author then goes on to remark, that the bones of fish, such as those of salmon, mackarel, and skate, afford phosphate of lime; but in a less proportion to the cartilaginous matter than is found in the bones of quadrupeds, &c. He also found, that bones in general, and teeth, both recent and calcined, contain a small quantity of carbonate of lime, occasioning slight effervescence with acids. The enamel of teeth was entirely soluble in acids, whilst the body of the tooth resembles bone, in the quantity of soft or membranous matter it contains. The enamel consists almost purely of phosphate of lime, cemented by a very small quantity of gluten.

Membranes and cartilages, and likewise horn, were found to contain no calcareous phosphate or ossifying substance, in their healthy state. The horns of the stag, or buck, are, indeed, an exception, and have every chemical character of bone, with some excess of cartilage.* The bones of the Gibralter rock were also found to consist principally of phos-

* The ingenious author has fallen into an error here, in calling the membranous part of bone *cartilage;* as the substitution of cartilage for bone, during the growth of an animal, is not brought about by the conversion of cartilage into bone; but the cartilage is absorbed, to make way for the future bone.

phate of lime, cemented together, in the maſs, by carbonate of lime. In this caſe, as in burned bones, the membranous part has been removed. The length of time neceſſary to effect this change is probably very great; for, after having, in the uſual manner, ſteeped in muriatic acid the *os humeri* of a man, brought from Hythe in Kent, and ſaid to have been taken from a Saxon tomb, the remaining cartilage was found nearly as complete as that of a recent bone.

ART. II. *A Syſtem of Diſſections. With Plates. By* CHARLES BELL, *Surgeon.* Parts IV. and V. Price 5s. 6d. each. Edinburgh, 1799. JOHNSON, &c. London.

THE two parts here announced conclude the firſt volume of Mr. Bell's ingenious and uſeful work, and comprize the Diſſection of the whole lower Extremity.*

The firſt ſection contains remarks introductory to the Diſſection of the Extremities; the Effects of the Muſcles and Faſcia upon the Veſſels; and the Peculiarities in the Diſtribution of the Veins and Arteries. In the diſſection of the thigh, Mr. Bell obſerves, the method of inveſtigation, as well as the object of it, is eſſentially different from that which is followed in the diſſections of the belly and thorax. We find the limbs made up of a ſolid muſcular fleſh, which ſurrounds the bones, gives ſymmetry and action to the limbs, and poiſes the trunk upon them; and, beſides the integuments common to every part of the body, we find them covered with ſtrong faſcia, or the aponeurotic extenſion of prolonged tendons. which not only ſupports and braces the muſcles in

* For an account of the former parts, ſee Medical and Chirurgical Review, vol. vi. pp. 55, 133.

their

their actions, but gives the limbs a defenſive ſtrength, by forming them into a firm concentrated pillar.

The fibres of the faſcia, too, mingling with the common cellular membrane, dive amongſt the deeper muſcles, and divide and claſs them into faſciculi, having ſimilar powers, and ſimultaneous action. We find the arteries branching among the muſcles, and expoſed, we might at firſt ſuppoſe, to be interrupted in their actions amongſt thoſe active and contractile parts; but theſe arteries have energy and force to overcome or reſiſt the contraction of the muſcles of the limbs. The more languid flow of blood in the veins is, indeed, left expoſed to caſual interruption by compreſſion of the muſcles; but this preſſure upon the veins is counteracted, or its bad effects avoided, by their peculiar diſtribution. In the legs and arms, and in the neck, and all fleſhy parts, there are two ſorts of veins:—the *venæ comites,* accompanying the arteries through their whole courſe amongſt the muſcles; and the *cutaneous veins,* which, though like the others they receive the returning blood from the arteries, take a different courſe to the heart, emerge from the oppreſſion of the muſcles, and return their blood by a ſuperficial diſtribution to the heart. We obſerve no ſuch variety of diſtribution in the cheſt or belly, no valves to counteract the retrograde impulſe of the blood; becauſe in theſe cavities there is no occaſional and partial action of parts, by which the return of the blood can be retarded, the preſſure being uniform through the whole cavity; and becauſe, from this uniform preſſure, no diſtribution of the veins could free them.

When any preſſure is made upon the upper part of the thigh, if the pregnant uterus, for example, ſhould preſs upon the veſſels of the pelvis, or a ſcirrhous tumour ſhould ariſe from the glands of the groin ſurrounding the crural veſſels, the veins are the firſt to ſuffer; the ſupply of blood is not diminiſhed, but the free return of the blood is retarded, cauſing oedema: and

in the caſe of an adventitious tumour, though both arteries and veins paſs through it, the arteries, by the ſtrength of their pulſation, remain free and poſſeſſed of full room for action, however large the tumour; while the veins, being more paſſive, having no action, are encroached upon by the tumour, and compreſſed, and the blood made to ſtagnate in their dilated extremities.

We learn from this, the author obſerves, the importance of making the preſſure uniform over all the lower part of the limb, when we apply bandages, or compreſs an artery. Were it poſſible ſo uniformly to compreſs a limb, from the toes to the top of the thigh, as to leave no part unincluded or unſupported (unleſs in inflammation of the parts), almoſt any degree of compreſſion might be uſed; for in that caſe the blood would flow uniformly over the whole limb; and, though ſtifled in a degree, no part would be overloaded with blood.

The author then proceeds to explain the particular diſſection of the faſcia, the glands, veſſels, and nerves; with the morbid anatomy of all theſe parts, as inflammation of the coats of veins, a ſubject, the knowledge of which we are almoſt wholly indebted for to the late Mr. Hunter: varicoſe, and other tumours connected with veins, are likewiſe ſpoken of.

Speaking of diſeaſes of the lymphatics of the lower extremities, the author objects to the opinion of Dr. Ferriar, reſpecting the nature of the ſwelling of the thigh, incident to women after child-birth. He conſiders, that the ſtate of the limb in theſe caſes is more of the nature of a critical ſwelling than a mere local affection, as Dr. Ferriar ſuppoſed; and that the obſtruction and inflammation of the lymphatics may be more naturally explained, upon the idea that this inflammation is ſympathetic, and communicated from the extremities of the lymphatics to their trunks, than that the diſeaſe is primarily in the lymphatics,

phatics, and their affection the cauſe of the ſwelling of the limb.

On the ſubject of tumours in the groin, the diſeaſes which may be miſtaken and confounded with each other are pointed out and explained: theſe are, femoral or crural hernia, with inguinal; bubo, with femoral hernia; common ſcrofulous abſceſſes of the inguinal glands, with the lumbar abſceſs; and lumbar abſceſs, with diſeaſe of the hip-joint.

It is not at every point, the author obſerves, under the ligament of the thigh, that the femoral hernia is found to protrude; but only between the femoral artery and vein, and the os pubis. It is immediately in the bend of the groin, and towards the inſide, ſo that it is very near the ſeat of inguinal hernia, from which, when inflammation and ſwelling have come on, obſcuring the ſpermatic chord, it is difficult, and ſometimes impoſſible, to diſtinguiſh it. But the difficulty is of no great importance, as our operation has only to be the more cautiouſly conducted in the firſt ſtage.—The lumbar abſceſs, when it points in the groin, commonly appears upon the outſide of the femoral artery, nearer the os ilium.

Reſpecting the accidents and diſeaſes of the arteries in the thigh, many important obſervations occur. The popliteal aneuriſm, likewiſe, is treated of minutely, and the preference due to the high operation, over the old method, examined. In the operation on the fore part of the thigh, it is not only requiſite to underſtand the anatomy and diſſection of the parts, but the means of hitting thoſe parts accurately in the living body. Here, for inſtance, the courſe of the ſartorius muſcle is of infinite importance. It is not eaſily brought into ſuch action as will ſhew its courſe on the limb; but if a weight be placed upon the ground, and we attempt to ſhove it ſideways with the ball of the great toe, it will be brought to ſwell, and ſhew its courſe. The inciſion is to be made on the inner

margin of this muſcle, beginning a little below the middle of the thigh, and following the curve of the muſcle. In purſuing the firſt inciſion under the ſartorius (its upper ſurface being kept in adheſion with the integuments), and betwixt the origin of the vaſtus internus, and the inſertion of the adductor magnus into the thigh-bone, we find the artery covered by irregular fibres of the faſcia. There appears to be no foreſight nor method of operating which can enſure ſucceſs in this operation, except by guarding againſt too large an inciſion; by the accuracy with which it is made to correſpond with the point of the artery to be tied; and by taking care that, in uncovering the artery, the parts are not too much looſened, eſpecially the ſartorius muſcle. When the wound is extenſive (and it is, perhaps, impoſſible to avoid it in a big and fat man), a large ſuppurating ſore is the conſequence; and there will be a greater chance of the ſinuſes forming up along the ſide of the artery, which ſometimes takes place, even in the moſt dexterous operation. The conſequence of this ſtate of the artery is, that, inſtead of being ſupported by the ſurrounding parts, it lies ſurrounded with matter; the ligatures, like ſetons, keep up the diſcharge; and, the veſſel ulcerating, the patient dies by the loſs of blood, if not by one guſh, at leaſt by ſucceſſive ſmaller bleedings. Another circumſtance with regard to the ſartorius muſcle is, that, when it is left looſe in the wound, it ſwells and fills up the opening, ſo that the matter is confined.

Having deſcribed the anatomy of the ham, and of the aneuriſm at this place, the author makes a compariſon of the different methods of operating for its relief. Without deciding in this important queſtion, he remarks,—' that the oſtenſible reaſon for the new method of operating, viz. on the fore part of the thigh, is, that the artery may be ſuppoſed to partake more of the diſeaſe, in proportion to its proximity to the tumour. But this is putting the merit of the operation

operation upon an inſecure footing; for we know that the diſeaſed ſtate of the arterial ſyſtem is always greater towards the trunks, and that it is gradually encroaching upon the extremities; that the diſeaſe is common to all the ſyſtem, though the peculiar ſituation of the artery ſubjects it to additional riſks. Theſe may even be increaſed by the circumſtances of a patient's general habits or way of life; but eſpecially this diſeaſe is frequent in ſuch as keep the joint habitually bent, but are liable to occaſional violent efforts of the limb, and chiefly of the gaſtrocnemii muſcles. It was formerly obſerved, that horſemen were more eſpecially expoſed to it; and that claſs of men ſtill continue to be the great ſufferers by this diſeaſe. Whatever may be our reaſoning upon this fact, it is evidently to be attributed to ſome cauſe which affects the portion of the artery which is ſubject to the flexion of the joint only; and if the ligature can be as eaſily and effectually ſecured three inches above the joint, as upon the fore part of the thigh, it will be as effectually removed from thoſe cauſes of failure of the artery which are peculiar to the joint, and there will be leſs chance of the general affection of the trunks having reached ſo far. The better reaſons for preferring the new operation ſeems to be, the difficulty of operating in the ham; the depth at which the artery lies; and, conſequently, the difficulty of drawing the ligature accurately: and, when the operation ſucceeds, a permanent contraction of the limb is apt to remain, probably ariſing from the great nerve being ſo much expoſed in the operation, that it muſt partake of the inflammation, and remain in the midſt of the parts condenſed and hardened in conſequence of it. The power, or conveniency rather, which the higher operation gives, of tying the artery again and again, following it up the thigh as the ligatures ſucceſſively give way, is but a forlorn hope; whilſt, in the lower operation, amputation can be more conveniently done, and with better expectation of ſucceſs. But the ſuperiority

riority of the new operation muſt be finally determined by thoſe gentlemen whoſe ingenuity and profeſſional ſkill have already done ſo much, and whoſe opportunities are unlimited.'

The author's remarks on the enlargement of the collateral branches of arteries, when the principal trunk has been obliterated, are highly ingenious, and of great importance, in a practical point of view.—'We ſhould naturally conceive,' he obſerves, 'upon a ſuperficial view, that, where the trunk of an artery is tied, the collateral arteries enlarge merely as a conſequence of the greater impulſe of blood into them. But it is evident that it is not the impinging of the blood upon their coats which diſtends them; ſince, when their extremities are tied, as after amputation, they do not dilate; and from an examination of the collateral arteries in aneuriſm, we ſee that there is not a dilatation or extenſion of the coats merely, but, at the ſame time, an increaſe of the ſtrength and thickneſs of the coats, as in the natural growth of the arteries. We have to ſhew how the arteries become tortuous, alſo, as they increaſe in power; and we hope to ſhew that this tortuous figure of the artery is the great means of the additional exertion.

'In Dr. Hunter's remarks upon the caſe already quoted, there are ſeveral inſtances of the ſerpentine courſe which arteries take, as illuſtrating the increaſe and convolutions of the artery of the arm in aneuriſmal varix. This change he ſuppoſes to happen—"becauſe the artery is lengthened, and, therefore, cannot preſerve its courſe;"—and that it is lengthened by the diſtention of the blood. Mr. John Bell, in his Anatomy of the Heart and Arteries, has objected to the reaſoning of Dr. Hunter, but has come nearly to the ſame concluſion.—"It is merely," ſays he, "a conſequence of the long-continued preſſure of the blood: it is this only which can account for the ſlowly-increaſing tortuoſity in the temples or hands of an old man, or the ſudden tortuoſity which the newly-

newly-dilated artery aſſumes, after the operation for aneuriſm." (P. 291.)—When the functions of an artery are conſidered, this matter will appear in a different light. As the artery poſſeſſes a power of accelerating the blood, or of circulating it by an action alternating with the heart, the force exerted by an artery upon the blood muſt be in proportion to the length of the artery. A portion of an artery, of the length of three inches, will have a greater power of accelerating the blood than one of two inches, though they are equal in diameter; there being in the one a greater latitude of action than in the other. The combination of the muſcular re-action of the firſt artery, exerted to accelerate the blood, will, when compared with that of the other, be as three to two. It follows, therefore, that the increaſed length of an artery, which has aſſumed the ſerpentine, zig-zag courſe, which arteries take in the ſeveral inſtances already mentioned, as in the temporal arteries, when a great tumour grows upon the head, in the collateral arteries in aneuriſm, and in the brachial artery in the aneuriſmal varix, is a means of additional force and power to the circulation. It ſeems to depend upon the ſame principle, and to be conſonant to the ſame laws which influence the increaſe of the artery in diameter and in muſcular ſtrength. That part of the member which remains beyond the ligature of the artery, in the operation for aneuriſm, comes to act upon the collateral branches in a manner ſtrictly analogous to the way in which a great tumour growing upon the limb, or upon the head, acts upon the arteries of the part. The arteries become enlarged and tortuous, with an increaſe of pulſation and force; or the limb acts upon its collateral arteries as its growth did upon the trunk, there being ſuch an effect mutually exiſting between the increaſe of the member in bulk, and the capacity and energy of the arteries which ſupply it. The ſerpentine form of the arteries in old age, is the natural courſe of the economy

nomy acting in a uniform tenor from childhood. It is a mark of the gradual failure, and a means of supporting the action, of the fyftem.

' The increafe of the collateral arteries after the operation for aneurifm, which, from experience, we know to be the harbinger of a fuccefsful termination, and of the clofing of the trunk, is to be accounted for upon the fame principle. It fhews a degree of youthful pliancy in the branches; it proves that the influence of the limb has fucceeded; that the current of blood has changed; and that the trunk of the artery is left dormant, to take thofe changes which are completely to preclude the flow of blood.'

The diffection of the leg and foot occupies the remaining portion of the volume, but contains nothing that need detain us longer.

Art. III. *Annals of Medicine for the Year* 1799: *exhibiting a concife View of the lateft and moft important Difcoveries in Medicine and Medical Philofophy. By* Andrew Duncan, *Sen. M.D. and* Andrew Duncan, *Jun. M.D. Fellows of the Royal College of Phyficians, Edinburgh.* Vol. IV. Octavo, 580 pages, price 8s. Edinburgh, 1800.

THE firft fection of the volume before us, and which contains, as ufual, an Analyfis of Books, confifts of eleven articles, moft of which have already paffed under our notice, viz. the Treatifes of Drs. *Jenner*, *Pearfon*, and *Woodville*, on Cow-pox; Beddoes, on Confumption; Drake, and Fowler, on the Ufe of the Digitalis; Memoirs of the Medical Society of Emulation at Paris; and Memoirs of the National Inftitute of Paris.—Of the two laft, we have, from time to time, exhibited many of the moft interefting articles.

Of

Of the foreign publications which have not reached us, and of which an account is here given, the firſt is—*Des Caracteres, du Traitement, &c.:* i. e. *On the Character and Mode of Treatment of Herpes, and Palſy of the lower Extremities; on Convulſions, Hooping-cough, Epilepſy, and Tetanus; on the Cure of Vomica and Tubercular Conſumption, by Means of the Rhus radicans, Narciſſus pratorum, and Agaricus piperatus: by* André Dufreſnoy, *M.D. and Botanical Profeſſor at Valenciennes.* Octavo. Paris, 1799.—This work is an enlarged re-publication of one which made its appearance in the year 1788, and contains a variety of general obſervations on the diſeaſes in which the remedies above-mentioned have been employed by the author. The *rhus radicans* is an acrid plant, ready to excite inflammation when applied to the ſkin, and was employed by the author, in infuſion, in caſes of herpes, with advantage. It is ſaid, likewiſe, to have completely ſucceeded in the cure of paralyſis, employed in the form of extract; but as it has been given in this way to the extent of an ounce, three times a day, and that without exerting any ſenſible action, we think its medicinal powers may be queſtioned, at leaſt in the form here propoſed.

The *narciſſus* is highly ſpoken of for the cure of epileptic and other ſpaſmodic diſeaſes. Its action was that of a mild emetic.—The advantages derived from the employment of the dried powder of the *agaricus piperatus*, and *delicioſus*, in pulmonary complaints, are too vaguely deſcribed, the editors obſerve, to authoriſe any concluſion with regard to their real efficacy in thoſe caſes.

Experiments on Stimulated Muſcular and Nervous Fibres, with Conjectures on the Chemical Proceſs of Animal and Vegetable Life: by Frederic Alexander Von Humboldt. Vol. II.—This treatiſe was publiſhed in the year 1797; it contains little, therefore, that has not found its way very generally to the public: the

the ſubject has frequently been before our readers, which makes it unneceſſary for us now to dwell on it.

Journal of Practical Medicine and Surgery:' by Dr. C. W. Hufeland, Profeſſor of Medicine at Jena. 7 volumes, octavo.—This Journal extends from the year 1795 to 1799, and contains a great variety of practical facts: through it a number of powerful remedies have either been originally brought into notice, or their uſe extended. Amongſt theſe, the *phellandrium aquaticum* is extolled as a remedy in hectic fever and phthiſis; but, as appears to us, on no very certain grounds.

The *nux vomica* is another article whoſe effects are here ſpoken of, and which, from its active properties, is doubtleſs capable of becoming an uſeful remedy. Its ſenſible effects are, giddineſs, anxiety, febrile ſhaking, followed by general inſenſibility, eſpecially of the limbs, and a convulſive ſtretching: it, likewiſe, ſometimes produces delirium. It was of great ſervice in dyſentery; and a ſevere caſe of aſthma is related, which was completely cured by this medicine alone. It was given in the doſe of four grains of the watery extract twice a day.

A caſe of madneſs is related by Dr. Bucholz, of Weimar, ſaid to have been cured by the *gratiola*, or *hedge-hyſſop*. It operated as a draſtic purge. Some remarks, likewiſe, occur on the uſe of *carduus benedictus* in catarrh, and on the *camomile*, as promoting the growth of granulations; but they are of little importance. The obſervations on the internal uſe of phoſphorus have already been noticed by us.

The mild vegetable alkali *(carbonas potaſſæ)* is highly ſpoken of, as a remedy in convulſions, by Dr. Michaelis, of Hamburgh. Twenty drops of the *ol. tart. per deliq.* were given to a child, three years of age. Dr. Michaelis was led to the uſe of this remedy from having repeated M. Humboldt's experiments on nervous excitation, and witneſſed the remarkable effects of the alkaline ſalts. Theſe evidently produced

duced inexcitability from excefs of ftimulus, and that fo rapidly, that no motions took place, exactly as with regard to opium: hence their probable utility as antifpafmodics.

The fecond fection of the Annals commences with a Cafe of Suppreffion of Urine and Stools, occafioned by the retroverfion of the pregnant uterus, which terminated fatally: by the late Dr. Rofs, Phyfician at Hamburgh.—This is an inftructive cafe, but does not well admit of abridgement.

2. '*Cafe of Uterine Hæmorrhage, where the Placenta was expelled four Hours before the Birth of the Child:' by* Mr. John Chapman, Surgeon, at Ampthill, Bedfordfhire.—In this cafe, notwithftanding it was nearly three hours from the firft protrufion of the placenta through the *os uteri*, to its complete expulfion through the *os externum*, the patient loft very little more blood than women ufually do when the placenta is expelled after the birth of the child; nor did any hæmorrhage of confequence take place, from the expulfion of the placenta to the birth of the child, which was full four hours.

The two next articles contain Remarks on Cowpox, by Mr. Chapman and Dr. Pearfon, a fubject with which our readers are already well acquainted.

5. '*Obfervations on the Pemphigus Major of Sauvages: by* Dr. R. Hall, Phyfician at Jedburgh.'—The reader will recollect fome remarks of the author, on the fame fubject, in the laft year's volume of Annals of Medicine. The difeafe re-appeared in one of the patients whofe cafe was before related.—'Mrs. H. had, for a few weeks previous to the prefent attack, been occafionally fubject to flight febrile paroxyfms, for which bark, &c. had been prefcribed, but were never diligently employed.

'Towards the evening of the 28th of July fhe was feized with giddinefs and head-ach; a fenfe of great laffitude and weaknefs, with other precurfory fymptoms

toms of fever. On the following morning her ſkin was preternaturally hot; pulſe frequent, weak, and irregular; head-ach rather more violent; reſpiration ſomewhat oppreſſed; was thirſty, but not coſtive; her tongue parched, but not foul. She had paſſed a reſtleſs and uneaſy night, and ſaid, that ſhe now apprehended the nature of her diſeaſe would prove ſimilar to that which ſhe had experienced laſt year. In the evening a ſingle veſicle appeared on the thigh.

'30th.—She had been equally reſtleſs as on the foregoing night; and, to an aggravation of the former ſymptoms, were now ſuperadded great irritability of the ſyſtem, and frequent, but irregular, ſhiverings. In the courſe of the day five more veſicles made their appearance on different parts of the body.

'Auguſt 1ſt.—A ſmall one appeared on the exterior part of the meatus auditorius. By the evening of the next day all the febrile ſymptoms had ſuffered a conſiderable abatement, but ſhe continued, for a few days, affected with much languor and debility; had a ſlight exacerbation of fever every night, with an evident apyrexia in the morning.

'Towards the decline of the complaint an eruption of ſmall pimples came on, eſpecially about the neck and arms, ſimilar to thoſe excited by nettle-burning, but which ſoon went off, without any bad ſymptom. The diſeaſe was mild, in compariſon with that ſhe had ſuſtained in the preceding year, and ſhorter in the term of its duration. The veſicles were few in number, and wholly confined to the external ſurface of the body. Thoſe that did appear were filled, however, in like manner, with a yellowiſh ſerum, and of the ſame magnitude as on the former occaſion: they were painful upon being touched, but the circumjacent ſkin was not much inflamed. Of two or three that were punctured ſhe complained a good deal, and obſerved, that her ſenſations after the operation were ſimilar, as ſhe conceived, to what would have been felt by her upon the application of any corroſive

rosive or caustic matter to the same part of the body. Upon the most diligent scrutiny, I could not discover that any person, either in the town or neighbourhood, had been affected with a similar complaint; nor was the disease communicated to any one, although, both now, and in the preceding attack, the patient had, at my particular request, continued to allow a person to sleep with her during the whole period of her illness.

'Both during the progress, and at the height of the disease, some of the fluid with which the vesicles were filled was taken, and with it I inoculated myself and two other persons, in both arms, making three punctures in each arm. In one of the patients, on the day after the insertion of the matter, a single puncture exhibited a very slight degree of inflammation; not, however, more than what frequently occurs from a scratch or puncture made with a clean instrument: but neither in this patient, nor in the other two, was any constitutional effect, or the least perceptible indisposition, produced. The result of these attempts to communicate the disease, by inoculation and contact, although not, perhaps, sufficiently numerous to prove decisive of the question, is at least extremely unfavourable to the hypothesis of those who assert the contagious nature of pemphigus, and tends strongly to support and confirm the negative conclusion.

'From the foregoing statement it would appear, that the following inferences may be fairly deduced.

'1st. That pemphigus is a disease of which persons are susceptible more than once in the course of their lives.

'2dly. That the disease originates where no source of infection can possibly be discovered, and seems generally connected with more or less of an affection of the whole system.

'3dly. That patients labouring under it may have constant intercourse with others, and yet never communicate the disease to any of them.

 '4thly.

'4thly. That the diſeaſe is not communicable, like the cow-pox or ſmall-pox, by inoculation.

'On the whole, when we comprehenſively ſurvey the evidence recorded by recent writers on the ſubject, as well as that furniſhed by the preſent, and former caſes, we muſt, I apprehend, be neceſſarily led to conclude, that the pemphigus major of Sauvages is an affection, merely ſporadic, and not of a contagious nature.'

6. *A Letter from Dr. Mitchill of New York, with Speculations concerning the perſpirable Fluids of the Human Body.*—Our readers are not wholly unacquainted with Profeſſor *Mitchill's* ideas on the ſubject of contagion and peſtilence. In the paper before us he endeavours to ſhew, that the matter of inſenſible perſpiration, in paſſing off from the ſurface of the body, leaves behind, as it evaporates, ſome of its more fixed, ſaline, and foeculent parts, together with a portion of carbon, phoſphorus, and ſepton (*azote*), with ſometimes an overplus of oxygen. Hence is produced a poiſonous or ſtimulant matter, which irritates or inflames the organ of feeling, producing various itchings, pimples, blotches, tetters, ſores, &c. being, in fact, the principal cauſe of the diſtempers of the ſkin. That the matter thus generated on the ſurface is of an acid nature (ſome modification of the ſeptic or nitrous acid), he infers, from the ſour ſmell proceeding from clothes that have been copiouſly imbued with *ſweat*, and from their diſpoſition, in ſuch circumſtances, to become rotten.

Beſides the cutaneous affections ſuppoſed to ariſe from this ſource, the author imagines, that theſe ſeptic productions are capable of injuring the conſtitution generally; cauſing, by a direct ſtimulant operation on the heart and ſanguiferous veſſels, after they are conveyed thither through the abſorbents ariſing from the cuticular ſurface, various *grades* of febrile diſturbance, of the intermittent, remittent, and continued

continued forms, and inducing diſtempered motions, glandular ſwellings, buboes, &c. in the lymphatic ſyſtem, as they paſs through its branches.

Another property of theſe ſuppoſed corrupted fluids is, to be volatilized by the heats of ſummer and autumn; and thus the author ſuppoſes *infection* may be excited and communicated; thus, alſo, collections of animal ſubſtances, or of other ſubſtances imbued with animal exhalations, become the frequent ſource of contagions. Admitting the truth of the ſpeculations here advanced, then alkalies, and ſoap, and lime, are the proper antidotes of contagion, and their mode of action ſufficiently apparent.

7. '*Hiſtory of a Caſe, terminating ſucceſsfully, in which an Inverted Uterus was extirpated*: by Mr. Alexander Hunter, Surgeon, Dumbarton.'—This ſingular caſe occurred in a young woman, a few days ſubſequent to delivery of her firſt child. Complaining of a ſuppreſſion of urine, on examination by the vagina, a tumour was felt of the ſize and ſhape of a large pear, adhering to the uterus with great firmneſs, and the apex projecting beyond the *os uteri* into the vagina. Different attempts were made to ſeparate the tumour from the uterus, but without ſucceſs. It gradually deſcended, and at length was entirely protruded, and together with it the whole body of the uterus completely inverted.—' With ſome difficulty,' the author obſerves, ' the lump was ſeparated from the fundus uteri, to which it ſtrongly adhered. I endeavoured then to reduce the inverſion; but after uſing every mean that I could think of, and ſometimes conſiderable force, for about two hours, without the ſmalleſt alteration, it was thought beſt to leave off. During the whole trial the patient felt no pain; and although the womb was ſeveral times ſqueezed with conſiderable force, it appeared inſenſible.

' The leaving the uterus in that ſituation gave me a great deal of uneaſineſs; and, being afraid that

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expoſure to cold would produce fatal ſymptoms, after conſiderable trouble it was forced back into the vagina, in its inverted ſtate.

'Next day ſtrong pains came on, and it was again protruded.

'The womb was a ſecond time returned into the vagina, and continued in that ſituation for eight days. During all that time no pain was experienced, except the ſlight inconvenience of drawing off the water twice a day.

'On the morning of the ninth day the prolapſus again took place, attended with pains, as formerly. It was now wiſhed that it might be allowed to remain in that ſtate, as the water would be thus diſcharged; and the ſupporting it with a bandage might be better than uſing force to place it in an unnatural ſituation within the vagina. Excepting a ſlight ſhooting pain through the tumour, no other uneaſineſs was yet felt.

'When the womb firſt came down it was nearly of the ſize of a ſmall pine-apple, and felt hard: the ſecond time it was ſmaller, but ſtill harder. Before returning it into the vagina a trial was always made to reduce it; but, after the firſt time, the fundus was only dinted by any force that could be uſed.

'The proſpect before the patient was now deplorable. The reſtoring the uterus was abſolutely impracticable; and, if allowed to remain in its preſent ſituation, it muſt be very diſtreſſing.

'About a fortnight elapſed in this way, when a new ſet of ſymptoms took place. A diſcharge of a thin watery nature began to flow from the whole ſurface of the womb, which gradually increaſed in quantity, and became ſo extremely fœtid, that it was very diſagreeable to enter the room; and, though great attention was beſtowed, the bed was always wet. Her ſtrength was ſoon much reduced; and, notwithſtanding a liberal uſe of bark, elix. vitriol, and port-wine, ſevere hectic attacks came on.

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'In this ſtate of the buſineſs no plan could be figured for ſaving the patient, without amputating the uterus. Every endeavour I had uſed for procuring information, either from medical men or books, left me ſtill in the dark; as in every caſe of inverſion mentioned, not one was to be found where the patient had ſurvived for any time, unleſs the womb was directly returned. But, after conſidering that the organ was not immediately neceſſary to life; that very extenſive wounds, even in its diſtended ſtate, have been made, without any ill ſymptoms; and that, in its preſent ſituation, the functions were for ever deſtroyed, indeed, that it was now only a burdenſome maſs, and the woman herſelf wiſhing eagerly to be relieved from the miſerable way ſhe was then in, it was determined to extirpate it.

'I began the operation by fixing a ſtrong ligature on the neck of the tumour, cloſe to the os externum; but being fearful of ſpaſmodic affections from this compreſſion, I waited ſix hours without proceeding farther. During all that time, however, no complaint was made, no pain was felt.

'With a ſcalpel the whole uterus was then cut off, cloſe to the ligature. Still neither ſymptoms of pain, nor even uneaſineſs, were perceived; and, I believe, the operation was over before the patient knew it had been begun. She was then laid to reſt, and an opiate adminiſtered.

'During the night ſhe ſlept well, and, next morning, was very much refreſhed. The hectic ſymptoms went off, her appetite returned, and in fourteen days ſhe was able to get out of bed. At the end of a month ſhe was perfectly recovered.

'Since that time ſhe has enjoyed a very good ſtate of health; except now and then ſome touches of hyſteric head-ach, and ſometimes ſtitches and plethoric ſymptoms in the ſpring and ſummer months. She does not menſtruate, although ſtill a young woman.

She has a tendency to obeſity, and even all her precautions cannot counteract it.

'From what happened in the preceding caſe, it will probably be allowed that the womb, when not in an inflamed ſtate, may be handled, or even wounded, without pain; that the whole of it may be cut off without injury; and that in caſe of inverſion, attended with ſevere flooding, if the womb cannot be returned, the hæmorrhage may be prevented by tying a ligature round the neck of the uterus.'

8. '*A ſingular Caſe of Chorea Sancti Viti, conſiderably relieved by the Uſe of the Argentum Nitratum: by* Dr. Thomas Hall, Eaſt Retford, Nottingham.'—The ſubject of this caſe was a woman, about thirty-ſix years of age, of a full and ſanguine habit, inclined to the melancholic temperament. The diſeaſe commenced with a violent involuntary motion of the head, removing, in the courſe of two or three minutes, to one or other of the extremities, and back again, continuing, in the whole, for the ſpace of half an hour, and returning every fortnight or three weeks. The diſeaſe was found to alternate with a cutaneous eruption, and with a ſwelling and inflammation of the legs; and ſeemed to take its origin from a depreſſion in the back part of the cranium, in conſequence of a violent blow with a poker. Nervous medicines, as they are called, were employed to great extent, but without advantage. A long interval between the fits was procured by the uſe of the *argentum nitratum*, in doſes of one ſixth part of a grain, increaſing it by degrees to a grain and a half, and even two grains, when it excited nauſea.—It does not appear whether or not a recurrence of the fits took place.

(To be continued.)

Art. IV. *Memoire dans lequel on examine, ſi l'Azote eſt un corps Simple ou Compoſé: an Inquiry whether Azote be a Simple or a Compound Body. By* Christopher Girtanner, *M.D. Gottingen.* (Ann. de Chymie. No. 100.)

THE diſtinguiſhed part performed by *azote* in moſt of the operations of Nature, has long been familiar to chemiſts, many of whom have applied themſelves to the ſtudy of its nature and properties with great and ſuccesſful aſſiduity. But it is eſpecially in organized bodies, that this principle is of the firſt importance. In the reſearches into the mechaniſm of life, in animals and plants, which the author has carried on for many years, he conſtantly, he obſerves, encountered this principle. He found it appear in his experiments, without being able to fix it, or to account for its introduction into the bodies from whence he had juſt extracted it. Hence he was led to conjecture, that azote was not a *ſimple,* but a *compound* body. The diſpute, which, indeed, is not yet terminated, reſpecting the azotic air ſuppoſed to be given out by the vapour of boiling water, fixed his attention more ſtrongly on the ſubject.

Meſſrs. *Wiegleb, Goettling,* and *Von Crell,* maintain that the vapour of water, in paſſing through ignited tubes, is changed into *azotic gas*; and that this change takes place conſtantly, and under all circumſtances; that the water is converted into *azotic air* by its combination with *caloric*; that it is the ponderable baſe, not only of *azotic,* but of all the other gaſes; and that, conſequently, the theory of *Lavoiſier* is deſtitute of foundation.

On the other hand, the Dutch chemiſts, *Von Hauch, Juch, Van Mons,* &c. contend, that the vapour of water, in paſſing through red-hot tubes, is never, *in any caſe,* changed into azotic gas; and that the production of this gas, in the experiments alluded to,

was not furniſhed by the decompoſition of the water, but by the atmoſpheric air accidentally preſent at the time: that, in conſequence, the theory of the French chemiſts remains unſhaken, and that the *phlogiſtic* hypotheſis, or that which ſuppoſes water to be the baſe of all the gaſes, is erroneous.

To endeavour to reconcile theſe diſcordant opinions, and thus to arrive ultimately at the truth, was the object of M. *Girtanner*, in the preſent inquiry. With this view he repeated, with the greateſt caution, the different experiments which led to ſuch oppoſite concluſions; and he gives the following as the fruit of his reſearches.

He found that azotic gas was obtained under the following circumſtances. 1. When the water was boiled in an earthen retort that was not glazed on the inſide, the vapour of the water being made to paſs either through a tube of glaſs, or any other material. 2. When the water was boiled in a glaſs retort which contained *argil* or *alumine*, whatever the ſubſtance of the tube was through which the vapour paſſed. 3. When the retort was of glaſs, and the tube, at the ſame time, of pipe-clay. 4. When both the retort and tube were of glaſs, provided the tube contained, within its cavity, *argil* or *alumine*. 5. When an earthen tube was filled with water, and encloſed in a larger one of glaſs, with ſand between the two, and the glaſs tube again encloſed in one of iron, with ſand between, and the whole thus expoſed to the fire; in this caſe azotic air was obtained. 6. When the water was boiled in a glaſs retort containing lime, whatever matter the tube conſiſted of through which the vapour paſſed. 7. When the retort contained *quartz* or *ſilex*. 8. The firſt experiment was found to ſucceed equally well, although the retort was coated *on the outſide* with a metallic varniſh. 9. So it was, likewiſe, with regard to the third experiment, when the tube was coated *externally* with the metallic varniſh. 10. Laſtly, the fourth experiment ſucceeded

ed equally, when, inſtead of *argil*, the tube was filled with *lime* or *quartz*.

On the contrary, no azotic gas, but merely aqueous vapour, was obtained under the following circumſtances. 1. When both the retort and tube were of *glaſs* or *porcelain*, without the introduction of any foreign ſubſtance. 2. When the retort, though of earth, was coated *on the inſide* with a metallic varniſh, the tube at the ſame time being of glaſs or porcelain. 3. When fragments of glaſs were placed in the retort, this and the tube being of glaſs or porcelain.*

Suppoſing, then, theſe experiments to have been fairly made, the difference above-ſtated is readily reconciled. M. M. *Ingenhouz*, *Von Humboldt*, and *Van Mons*, as well as M. *Girtanner*, have obſerved, that moiſt earths poſſeſs the property of abſorbing the oxygen of the atmoſphere, at the ordinary temperature; and they do this more readily and largely when heated. At a higher temperature than that of the atmoſphere, they deprive water of a part of its oxygen. *Argil (potter's earth* or *alumine)* ſeizes oxygen with the greateſt avidity, and that at a temperature much below that of boiling water. *Lime* requires a more elevated heat, and abſorbs leſs oxygen. *Silex* muſt be brought to a red heat, to enable it to combine with oxygen, but then it abſorbs it with ſufficient rapidity. *Baked clay* likewiſe abſorbs oxygen, but only at a high temperature. *Glazed earth* does not abſorb oxygen, becauſe the glazing matter, being a metallic glaſs, has no action on the acidifying principle.

From what has been ſaid, M. *Girtanner* obſerves that he finds little difficulty in explaining the phenomena of the change of water into azotic gas; and

* In order to obtain the greateſt quantity of azotic gas in this way, care muſt be taken, M. *Girtanner* obſerves, to evaporate the water ſlowly, and over a very gentle fire, and not to raiſe this too ſuddenly.

which

which he confiders to be brought about by the action of a double affinity. The oxygen of the water unites in part to the earth, and converts it into an earthy oxide; the remainder of the oxygen, united with the hydrogen, combines with caloric, and forms azotic gas; confequently, according to the author's hypothefis, *azote is water deprived of a certain part of its oxygen.* In fupport of this opinion the following facts are adduced.

When the vapour of water is made to pafs through heated tubes containing tin filings, *azotic,* mixed with *oxygen,* gas is obtained. The tin is found changed to the ftate of oxide, and this oxide accompanies the azotic gas and aqueous vapour into the receiver. In this cafe, according to the author's principles, the metal deprives the water of a part only of its oxygen; the remaining part unites with the hydrogen, and forms azote.—The fame thing takes place when lead is employed inftead of tin. The proportion of azotic gas thus obtained, to the oxygen gas, is nearly as 64 : 36. When antimony is thus treated, the proportion of azotic, to oxygen gas, is as 89 : 11.

When the aqueous vapour is made to pafs over the black oxide of manganefe, deprived as much as poffible of its oxygen, by previous expofure to a long-continued and violent heat, pure oxygen gas is obtained at firft, and afterwards fome azotic gas. In this cafe, the manganefe greedily abforbs the hydrogen of the water, at the beginning of the operation, and afterwards a part of its oxygen. The production of azotic gas now goes on, as long as the experiment is continued.

Dr. *Pearfon,* in decompofing water by the electric fpark, always obtained fome azotic gas, as well as the two gafes of which water is compofed. The fame chemift likewife obtained water and azotic gas, by burning a mixture of oxygen and hydrogen gafes in tubes hermetically fealed. Dr. *Prieftley* obferved, that oxygen gas, by remaining for fome time in contact

tact with the pureſt diſtilled water, is changed in part into azotic gas, and the author found the quantity thus changed to amount to one-tenth of the whole.

A mixture of hydrogen and nitrous gas, after remaining ſome time in contact with water, no longer burns, and is found converted into atmoſpheric air: this M. *Girtanner* explains, by ſuppoſing that the hydrogen combines with a portion of the oxygen of the nitrous gas or water, and is thus changed into azotic gas. Dr. Prieſtley found frequently, though not always, that hydrogen gas which had been for a long time in contact with water, was entirely changed into azotic gas: this, the author imagines, is owing to the oxygen gas previouſly contained in the water employed in the experiment.

M. *Yelin* ſays, that azotic gas is obtained by burning eleven parts of hydrogen gas with one of oxygen; but this experiment did not ſucceed in the author's trials. M. *Y.* likewiſe found, that when the vapour of water is made to paſs through a heated gun-barrel, which is entirely oxydated on the inner ſurface, in conſequence of having been repeatedly employed in experiments of this kind, hydrogen gas was no longer obtained; but, in its ſtead, azotic gas, the iron being no longer capable of abſorbing all the oxygen of the water in paſſing through it.

M. *Lampadius* found, that by melting arſenic in the pureſt azotic gas, procured by the combuſtion of phoſphorus, the metal was ſublimed, and changed in part into the ſtate of oxide: thus proving the preſence of oxygen in the azotic air.

When, in the formation of water by the combuſtion of its two conſtituent gaſes, the quantity of hydrogen is too great, nitric acid is produced.

The following experiment of *Scheele* is cited by M. Girtanner, in proof of azote being merely *oxydated hydrogen.* "I filled," M. Scheele obſerves, "a bladder with inflammable air, procured by the ſolution

ſolution of iron in the vitriolic acid, and breathed this air. Having made thus twenty inſpirations, I was obliged to deſiſt. After having recovered myſelf I expired, as completely as I could, all the air contained in my lungs, and then breathed this inflammable air anew. After ten inſpirations I could proceed no farther. The air being now examined, was no longer inflammable, and occaſioned no precipitate from lime-water: in a word, it was mephitic air (azotic gas)."*—In this experiment, the author obſerves, the pure hydrogen gas combines in the lungs with the oxygen gas remaining there from the former inſpirations of atmoſpheric air, and thus forms azotic gas.

Such are the principal of the facts here adduced, in ſupport of the opinion that azotic air is a compound of hydrogen and oxygen. M. Girtanner engages, in a future memoir, to bring forward a variety of other experiments in proof of the ſame point.

Admitting, then, that ſuch is the nature of azotic gas, it reſults, in conſequence, that the atmoſphere is not, as hitherto ſuppoſed, a mixture of oxygen and azotic airs, but rather a mixture of oxygen and hydrogen gas; a water, if the expreſſion may be allowed, in the form of gas. When, in eudiometrical experiments, the oxygen is ſeparated from the hydrogen, the ſeparation of the two airs is never perfect and complete. A part of the oxygen ſtill remains, and by its union with the hydrogen, forms that chemical combination we term *azote*, and which we obtain in thoſe experiments. The oxygen, ſo indiſpenſable for ſuſtaining the life of all organized beings, is changed, by its combination with hydrogen, into azote, a ſubſtance which is not only not proper for the ſupport of life, but is a true poiſon, in conſequence of its

* *Von luft und feuer*, p. 136.

affinity

affinity for oxygen, and the avidity with which it ſeizes this principle from organized bodies.

It is exceedingly difficult to deprive atmoſpheric air of the whole of its oxygen. The experiments that have been contrived for this purpoſe ſtill leave a ſmall portion behind, which, uniting with the hydrogen, forms azotic gas. It is, however, poſſible, M. Girtanner obſerves, to deprive atmoſpheric air of nearly the whole of its oxygen, by heating phoſphorus in it for a conſiderable length of time. When this is done, *phoſphorated hydrogen gas* is obtained by the change of a part of the azote into hydrogene.

The influence of this doctrine, of the compound nature of azotic air, on eudiometrical experiments, and on the manufacture of ſalt-petre, are next pointed out. The following bodies are conſidered as combinations of hydrogen with oxygen, in different proportions: *azote*; *gaſeous oxyd of azote*; *nitrous gas*; *nitrous acid*; *nitric acid*; *muriatic acid*; *oxygenated muriatic acid*; *nitro-muriatic acid*; *water*; *atmoſpheric air*; *ammoniac.* And the author hopes to prove hereafter, that pot-aſh, ſoda, and ſulphur, may be added to the liſt. He conſiders phoſphorus as hydrogen in the pureſt ſtate we are acquainted with.

An extract from a paper of M. *Mayer* on this ſubject is next given. The notion of the compound nature of azote was firſt ſtarted by this gentleman; but he offered it as conjecture only, the truth of which he had not aſcertained by any experiment.—‘ I conſider,’ M. Mayer obſerves, ‘ with M. *de Luc*, that the evaporation of water, as performed by Nature on the grand ſcale, is a real change of water into air, although we are not able to imitate this proceſs in our laboratories, becauſe we are ignorant of the influence which electricity and light exert in the operation. However, it appears to me probable, that the ponderable parts of atmoſpheric air, to wit, oxygen and azote, have no other origin than the water diffuſed over the ſurface of the globe. It ſeems impoſſible, that the ſmall quantity of oxygen gas exhaled

haled by vegetables, by the influence of the ſolar light, ſhould ſuffice for the ſupply of the enormous quantity of oxygen daily conſumed in our atmoſphere in ſo many different ways. But, ſuppoſing, according to this theory, that one hundred grains of water are changed, by the unknown proceſs of Nature, into one hundred grains of atmoſpheric air; that is, into a chemical mixture of oxygen and hydrogen, it would be eaſy to find, by a ſimple calculation, in what proportion theſe combine to form the azote which we find in our atmoſphere: the reſult of the calculation is, that one hundred grains of azotic gas are compoſed of ſeventy-nine of oxygen, and twenty-one of hydrogen.'—M. *Girtanner* then applies the ſame method to the other ſuppoſed oxides of hydrogen above-enumerated; and calculates, that one hundred parts of ammoniac contain about ſixty-three of oxygen: azote, ſeventy-nine: atmoſpheric air, eighty-four: water, eighty-five: gaſeous oxide of azote, eighty-ſix: nitrous gas, ninety-three: nitrous acid, ninety-four: and nitric acid, ninety-five, omitting fractions.

Are oxygen and hydrogen, the author aſks, the two primitive elements of which all corporeal things are compoſed? This appears to him not improbable; it ſeems likely, alſo, he obſerves, that the heavier a body is, the more it contains of oxygen, concentrated and deprived of caloric; and that bodies are light, in proportion to the hydrogen they contain.

But that which eſpecially demands the attention of the philoſopher, M. Girtanner remarks, is, that when we expoſe water to the ſun, the light decompoſes it, and ſeparates its oxygen in great quantity; the remaining portion of this principle is retained by the hydrogen, and forms azote; the preſence of which is announced by the green colour that takes place on the ſurface of the water. The water becomes more and more decompoſed; the oxygen (which the author ſays he has *demonſtrated* to be the principle

ple of life and irritability in all organized nature) becomes more fixed; and the azote, produced from the water by the influence of the ſolar light, is a truly organized body; in a word, the *conferva fontinalis*, a plant which lives, grows, and perpetuates its ſpecies. The influence of light, M. Girtanner obſerves, is abſolutely neceſſary to the taking place of this tranſmutation of water into a plant, no degree of heat whatever being alone adequate to the purpoſe: a ſufficient proof, of itſelf, this, that *light* and *heat* are ſubſtances altogether different.

'I am aſtoniſhed,' M. Girtanner obſerves, 'that this green matter, this *fontinalis*, to which I have given the name of *organized azote*, has not more excited the attention of chemical philoſophers. It is the moſt wonderful ſubſtance exiſting; the moſt ſingular of natural productions. Nothing can be more abſurd than what *Prieſtley* has ſaid with regard to it. To reaſon in the way he has done is perfect folly. This celebrated chemiſt, whoſe name will live as long as ſcience ſhall be cultivated, has made the moſt important diſcoveries. I admire his ſagacity; but, at the ſame time, am ſorry to obſerve, in all his works, that he is more of an experimenter than a philoſopher. Whilſt diſplaying to us with one hand the wonderful ſecrets of Nature, he keeps the other always ready to ſhut our eyes, in caſe we ſhew a diſpoſition to penetrate farther than he approves. He has given a ſtriking inſtance of his unwillingneſs to let us view the wonders of Nature otherwiſe than through his *eccleſiaſtical glaſs*, in the diſpute ſubſiſting between him and M. *Ingenhouz*, with regard to this very ſubject. This enlightened naturaliſt, having deſcribed a great number of experiments on this ſingular ſubſtance, adds—" Water itſelf, or ſome ſubſtance contained therein, appears to me to be changed into this ſpecies of vegetation. It is a real tranſmutation, which may appear incomprehenſible to the philoſopher, but which, at bottom, is not more extraordinary than the change of herbs,

herbs, and other vegetable matters, into fat, in the bodies of phytivorous animals, or the change of the watery juices of the olive into oil."

'Water is changed into a plant—ſuch is the fact; and *Ingenhouz* goes no further: he ſays—"I do not at all comprehend *how.*"—This is the language of philoſophy. *Prieſtley*, on the contrary, is ſcandalized by ſuch language. He aſks M. *Ingenhouz*—"if he is not aſhamed of reviving the long-exploded doctrine of ſpontaneous or equivocal generation?"—In this he reſembles the *Inquiſitor*, who endeavoured to prove to the immortal *Galileo* that the ſun turned round the earth.'—The ſuppoſition of Dr. *Prieſtley*, offered in explanation of the fact, of this ſpecies of vegetation going on in well-cloſed veſſels, viz. that the ſeeds of this plant are diſperſed every where, and float in the air; and that they may even find an entrance through ſome unperceived fracture or fiſſure in the glaſs or veſſel employed, is treated as altogether abſurd.*

The opinions of M. *Girtanner*, here diſplayed, are calculated, in the event of their being ſatisfactorily eſtabliſhed, to effect a grand revolution in chemical ſcience, eſpecially in its application to the phenomena of organized beings. To many they will, doubtleſs, appear extravagant and hypothetical, requiring for their ſupport a much wider range of varied and cautious experiment than has yet been adduced in their favour. They amply merit, however, the attention of the philoſophical chemiſt; and time and further inquiry muſt decide on their real importance.

ART. V. *Elements of the Natural Hiſtory, and Chymical Analyſis of Mineral Subſtances; for the*

* Some further obſervations on the curious ſubſtance found on the ſurface of ſtagnant water, will be found in the Miſcellaneous part of our preſent Number.

Uſe

Uſe of the Central Schools. Tranſlated from the French of MATHURIN JAMES BRISSON, *Member of the National Inſtitute, &c.* Octavo, 148 pages, price 4s. London, 1800. WALKER, &c.

IT was the duty of the author, as a Profeſſor in the *Central School* at Paris, to teach both the elements of natural philoſophy and thoſe of chemiſtry; and being convinced, that in order to underſtand clearly the manner in which the ſeveral ſubſtances act on one another, and the effects reſulting from their combinations, it is neceſſary to have a previous knowledge of the nature of thoſe ſubſtances, he thought it incumbent on him to claſs, in fit order, the mineral bodies, and to point out the chief characters by which they are diſtinguiſhed. This taſk he appears to us to have executed with much clearneſs and preciſion, and to have furniſhed us with a work exceedingly well calculated to introduce the ſtudent to the firſt ſteps in mineralogical ſcience. We proceed to point out the plan which the author has traced in his work.

The treatiſe comprizes two principal diviſions: firſt, *Lithology*, or the ſcience of earths and ſtones: ſecondly, *Metallurgy*, or that which treats of metallic ſubſtances.

The author begins with the *primitive earths*, which are reputed ſimple ſubſtances. Theſe are, *lime, magneſia, baryte, alumine*, and *ſilice*, or flint; to theſe are added, at the end of the work, the two newly-diſcovered earths, the *ſtrontian*, and *Jargonia*. Of all theſe, the nature and diſtinguiſhed properties are pointed out; and, likewiſe, the methods proper for obtaining them in a ſtate of purity.

All the different earths and ſtones appear to be formed by the primitive earths above-mentioned. Theſe are ſometimes found combined with acids, and form with them *ſaline ſtones*, or *earthy ſalts*; ſometimes they are ſimply mixed with one another, and

form *ſtones* properly ſo called; ſometimes theſe laſt are joined by ſome kind of cement, and form *rocks.* There exiſts alſo a fourth ſort of ſtones, viz. thoſe produced by the fire of volcanoes. Hence ariſe four different *orders* of ſtones.

The primitive earths being five in number, the firſt order, *ſaline ſtones,* or *earthy ſalts,* is compoſed of five *genera,* each diſtinguiſhed by the peculiar earth which forms its baſis. The combinations of this with the different acids, conſtitute the *ſpecies* of each genus. Thus with regard to *lime*; the firſt *ſpecies* is, its combination with carbonic acid, forming *lime-ſtone, calcareous ſpar, alabaſter, ſtalactites,* and the different ſorts of *marble.* By the union of lime with the *ſulphuric* acid, gypſums, ſelenites, and plaſter-ſtones, are compoſed. With the *fluoric* acid, *fluates of lime* are formed, commonly called *ſpath fluor,* or *vitreous ſpar.* With the nitric acid, the nitrate of lime, or calcareous nitre is formed, but is not found naturally in a ſolid form. Lime with the *muriatic* acid forms *muriate of lime,* or *calcareous marine ſalt,* exiſting chiefly in ſea-water, to which it imparts its bitter taſte. The combination of lime with the phoſphoric acid, *phoſphate of lime,* is found in great quantities in the province of Eſtremadura, in Spain. It forms the ſolid and hard part of bones, and hence has been denominated *animal earth.*

The ſecond *genus* of ſaline ſtones comprizes thoſe which have *magneſia* for their baſis. Theſe earthy ſalts have been only well known ſince *Black* ſhewed their difference from calcareous ſalts; from which they are eaſily diſtinguiſhed by means of lime-water, which decompoſes them, and precipitates their magneſia. The combination of magneſia with the ſulphuric acid forms *Epſom* or *Sedlitz* ſalt. With the nitric acid, *nitrate of magneſia* is formed. With the muriatic, *muriate of magneſia,* a ſalt found in the bittern, or mother-water of the ſalt works. The combination of magneſia with carbonic acid, *common*

magneſia,

magneſia, is rarely, if at all, found naturally formed; but is precipitated from the ſolution of Epſom ſalt by means of the alkaline carbonates.

Genus III. *Saline ſtones with barytic baſis.* Barytes forms with the ſulphuric acid, *ſulphate of barytes,* or *heavy ſpar,* and is the ſtate in which it is moſt commonly found. With carbonic acid, the carbonate of baryte, or aerated barytes, is formed, in which ſtate it is rarely found. The combinations of baryte with the nitric or muriatic acids, have never yet been found native, though eaſily formed by art.

Genus IV. *Saline ſtones with baſis of alumine.* Alumine is capable of combining with the greater number of the acids, but its moſt frequent combination is with the ſulphuric acid, forming the *ſulphate of alumine,* or common *alum.*

Genus V. *Saline ſtones with ſiliceous baſis.* This genus has very narrow limits. *Silice* very difficultly combines with acids; and the only one that acts on it in a ſtriking manner is the *fluoric* acid, by which it is diſſolved. A greater quantity of ſilice is kept in ſolution by this acid in the ſtate of gas, than when united with water.

The ſecond *order* embraces *ſtones properly ſo called.* The ſimple and pure primitive earths are ſeldom found ſeparate on the ſurface of the globe. Commonly they are found mixed with one another, and form maſſes of different volumes, and different hardneſs, according to the nature of the earths which are mixed together, and of the extraneous matters which are combined with them. In theſe mixtures one earth generally predominates over the others, either by its greater quantity, or by imparting its character to the mixture. This circumſtance determines the *genera,* which are five, according to the number of the primitive earths. The *ſpecies* are diſtinguiſhed by the different principles which conſtitute them:

 whilſt

whilſt the different proportions of theſe form the *varieties.*

According to this order, there are, 1ſt. the *calcareous mixtures,* of which there are ſeveral ſpecies. 2. *Barytic mixtures,* comprehending only two ſpecies, one of which is the *hepatites* or *liver-ſtone.* 3. *Magneſian mixtures,* including the *ſerpentines,* the *ſteatites,* the *aſbeſtos,* the *amianthus,* and the *talcs.* 4. *Aluminous mixtures;* as the *micas,* the *hornblends,* the *clays,* the *ſchiſts,* and the *zeolites.* 5. *Siliceous mixtures,* all the ſtones of which genus give fire with ſteel. To this belong all the gems and precious ſtones, *rock-cryſtals* and *quartz, felt-ſpar, flints,* and *ſhorls.*

The third order embraces *Rocks,* which conſiſt of the ſtones before treated of, differently aggregated, and united by any common cement. A great number of varieties of *rocks* are found; but only ſeven are here particularly ſpoken of, (the others being ſeldom found, and in ſmaller maſſes), viz. *porphyries, ſerpentines, ophites, granitelloes, granites, mill-ſtones,* and *pebbles.*

Volcanic productions conſtitute the fourth *order* of ſtones. Theſe are the ſubſtances produced by volcanoes actually burning, or found about thoſe that are extinguiſhed. Such are the *pumice ſtone, lava,* and *baſaltes.*

The ſecond diviſion of the work before us treats, as has been ſaid, of *Metallurgy,* the object of which is, the knowledge of metallic ſubſtances. Of metallic ſubſtances ſome are malleable and ductile, that is to ſay, have the property of extending themſelves under the hammer: others are very little, if at all, malleable. Hence an obvious diviſion into two orders, denominated *metals,* and *ſemi-metals.*

There

There are two *genera* of *metals*, viz. the *perfect*, the character of which is, that they are in an eminent degree ſuſceptible of being extended, and remain fixed when expoſed to the moſt intenſe action of fire, without diminution of weight, or ſenſible alteration: ſuch are *gold*, *ſilver*, and *platina*. The ſecond *genus*, or the *imperfect metals*, are leſs malleable than the former, and are fixed only in certain degrees of heat, in higher than which they are altered. They combine with oxygen, and change to an earthy ſubſtance, called metallic oxyd. Of this kind there are four ſpecies,—*copper*, *iron*, *tin*, and *lead*.

The ſecond *order* of metallic ſubſtances comprizes the *Semi-metals*. Theſe have little, if any, ductility, and, like the imperfect metals, are not fixed in the fire. The greater number of them are ſublimed, or reduced into vapour by the action of fire. There are eleven ſpecies of the ſemi-metals known, viz. *mercury*, *biſmuth*, *cobalt*, *nickel*, *zinc*, *antimony*, *tungſten*, *arſenic*, *mangane ſe*, *molybdena*, and *titanium*. Of each of theſe the diſtinguiſhing properties are here noticed.

To the whole are ſubjoined *Tables* of the Properties of Metallic Subſtances, pointing out, in a decreaſing order, 1. their fixity in the fire; 2. their ductility; 3. their fuſibility; 4. their hardneſs; 5. their tenacity; 6. their elaſticity; 7. their ſonorous quality; 8. their ſpecific gravity; 9. their oxydability; 10. their increaſe of weight by oxydation; 11. their affinity with the acids; 12. their adheſion to mercury, or amalgamating property; and, laſtly, their property of becoming acidified:—this laſt property is known to be poſſeſſed by the ſix following only, viz. arſenic, molybdena, tungſten, mangane ſe, tin, and ſilver.

From the view which has now been given of this elementary treatiſe, we have no doubt its utility will be readily acknowledged. It is, indeed, in every re-

ſpect, fitted for accompliſhing the purpoſe intended by its author; and we cannot forbear recommending it to the attention of the mineralogical ſtudent.

ART. V. SAMUELIS THOMÆ SOEMMERING *Icones Embryonum Humanorum.* Tab. II. 10 pages, large Folio. Frankfort, 1799. Imported by T. BOOSEY. London, 1800. Price 1*l.* 11*s.* 6*d.*

UNCOMMON pains have been taken to render the preſent work perfect in its kind; and it muſt undoubtedly be allowed to have few rivals. The plates are executed with unuſual accuracy and elegance.

In the Preface, the learned author gives a liſt of thoſe writers who have furniſhed us with original delineations of the human fœtus, from the year 1600 to the preſent time. A due tribute of applauſe is here beſtowed on our countrymen, W. Hunter, and Denman. In the ſplendid work of the former a delineation of the fœtus is given, from the fourth month after conception to its maturity. The Tables of Dr. Soemmering, comprizing, in the whole, twenty different figures, are calculated to fill up the void, from the third week, to the period taken up by Dr. Hunter: the work thus exhibits a complete ſeries of the appearances of the human embryo, from its origin to its perfect ſtate. To render his work a ſtill more fit companion for that of Dr. Hunter, the author has cauſed it to be executed in a ſimilar ſtyle, with regard to the ſize of the plates and the letter-preſs.

Dr. Soemmering next points out the ſources whence he was enabled to procure a ſufficient variety of fœtuſes to permit him to complete his plan. For this purpoſe, he has had recourſe to the moſt celebrated collections in different parts of Europe: from theſe he has ſelected the moſt perfect ſpecimens for delineation at each period,

period, diſpoſing the whole afterwards into proper form and order. To each figure is ſubjoined a ſhort explanation, for the double purpoſe of calling the reader's attention to the moſt ſtriking appearances, and, likewiſe, for pointing out thoſe circumſtances, which a mere inſpection was unequal to.

The peculiarities of the foetus, at different periods from conception, as compared with the adult, are next ſhewn: the differences of fœtuſes with regard to ſex, as obſervable in the ſtructure of the thorax, the abdomen, in the head, in the limbs, and in the ſpine, are, laſtly, pointed out.

The embryo is conſtantly found to increaſe moſt rapidly in bulk during the firſt days and weeks after conception; from this period, to the ninth month, the increaſe gradually leſſens. This increaſe, however, by no means proceeds in an equal and regular manner to the attainment of the full ſize. In the ſecond month the growth appears to be retarded; in the third accelerated; in the beginning of the fourth, again it proceeds more ſlowly; after the middle of the fourth month, and from thence to the ſixth, the growth becomes more rapid; from which period to the end of geſtation, it becomes regularly ſlower: the ſame has been obſerved of the principal viſcera.

It appears, alſo, that the different parts of the embryo advance to perfection with different degrees of celerity. The younger the embryo, the larger and firmer is the ovum. In the firſt and ſecond months the embryo is obſerved bent forwards in a curve, reſembling, in ſome degree, a ſmall worm: in the ſucceeding month it is a little extended; but at every period of geſtation the head is bent forwards on the breaſt.

The younger the fœtus the larger is the head, in compariſon with the body: about the ſecond month, the trunk becomes nearly equal in ſize to the head; the face, likewiſe, is ſmall with regard to the ſkull, according as the embryo is younger. The neck in ſome degree correſponds with the head in its growth

and is hardly difcernible, on account of the bend of the head forwards, before the third month.

The limbs appear lefs, in refpect of the trunk, according as the embryo is younger. In the beginning they appear as fmall hemifpherical tubercles, fhooting out from the trunk. In the fecond month they become more elongated: then the upper extremities begin to be diftinguifhable into arms and hands; the lower, into legs and feet. The fingers now appear like fmall papillæ; and, at the fame time, the arms grow more into fhape and form. At this period, the thighs, legs, and feet, become diftinguifhable; but the toes are ftill wanting, and are not obfervable till the completion of the fecond month. During the firft, fecond, and third months, the bulk of the fuperior extremities exceeds fomewhat that of the lower: in the fourth, they are nearly of equal fize; whilft, in the fifth month, the proportions are reverfed.

The lower extremity of the fpine, which, during the firft two months, is large, and projects beyond the inferior extremities like a keel, by the gradual extenfion of thefe, in the third month, ceafes to be diftinguifhed.

The eyes are the firft of the organs of fenfe which can be difcerned, and are of confiderable fize. being the more prominent in proportion as the embryo is fmaller; fo that they are readily diftinguifhable in the fmalleft fœtufes, by a very black circle. Before the completion of the fecond month, the palpebræ are either open, or fo tranfparent, that the globe of the eye, with its *pigmentum nigrum*, may be difcerned through them. After the tenth week, the eyelids are found firmly clofed, and the rima fomewhat lefs in diameter than the globe itfelf. In the fifth month, the external ear is obferved to be complete in all its parts; two fmall foramina being all that is at firft obfervable. And fo, likewife with regard to the noftrils; the nofe beginning to fhoot forth about the feventh week. The mouth, in the firft months, is

large,

large, and partly open; the lips not being yet diſtinguiſhable. Theſe at length begin to appear, and become diſtinctly formed. After the third month, the mouth is commonly obſerved to be cloſely ſhut.

The genital organs, ſcarcely to be obſerved during the firſt weeks, in either ſex, at the beginning of the third month advance rapidly. The penis is larger in proportion as the embryo is younger; and the glans is denuded. The ſcrotum is ſmall, and empty, even to the ninth month: ſometimes corrugated into a hard tubercle; at others, diſtended with water. In females, the vulva is ſometimes diſtinguiſhable as early as the ſecond month. In the third, the clitoris is large and prominent, and might readily be miſtaken for the penis, on a lateral view. From this period it gradually diminiſhes in ſize.

The navel-ſtring, when it firſt appears, is ſhort and thick; ſo that in a very ſmall embryo it ſeems nearly to equal the trunk of the body: after this it becomes gradually elongated. It always appears unequal and knotty throughout its length.

—Such are the moſt ſtriking peculiarities of the embryo-ſtate.

ART. VI. *Diſſertations ſur les Fievres Pernicieuſes, ou Ataxiques Intermittentes:* i. e. *Diſſertations on Malignant or Irregular Intermittents. By* J. ALIBERT, *M.D.* Paris, 1799.

THE name of M. *Alibert* is known to our readers on more than one occaſion. In the work before us, he treats of a various and important claſs of maladies; and, according to his French reviewers, with much judgment and ability. He divides irregular intermittents, or remittents, into eight principal varieties; denominating each according to the particular ſymptoms which characterize it.

Speak-

Speaking of their remote caufes, as originating in marfhy and low countries, he remarks on the imperfections of eudiometrical inftruments, as affording a teft of the falubrious or infalubrious ftate of the atmofphere. The air of marfhy foils, he obferves, frequently affords, on trial, refults no wife differing from the air of the moft healthy fituations. This is confirmed by the obfervations of Gattoni. Some of the marfhes in Italy, he remarks, are fo unwholefome, that a ftranger chancing to fleep a fingle night in their vicinity, is fure to be attacked by a fever. Yet the air of this fpot, on being compared, by means of the eudiometer, in the moft cautious manner, with that of the fummit of the mountain *Legnone*, which is always covered with fnow, was found, contrary to all expectation, confiderably purer, that is, containing more oxygen, than this laft. M. *Sauffure*, likewife, obferved, that the air on the tops of mountains contains a larger proportion of azote than that of plains or valleys.

It is evident, therefore, that the falubrity of the air is not to be meafured merely by the quantity of oxygen it contains; and in marfhy fituations, efpecially, the eudiometer is a fallacious guide. M. *Alibert* propofes a means of overcoming this difficulty, and of leading to the difcovery of the peculiar quality of the air to which it owes its noxious power, which, if it does not accomplifh the views of the author, is at leaft ingenious.

He fuggefts the ufe of a cryftal cone, hollowed out, but open only at its large extremity. This is to be inverted, and fufpended over another veffel of cryftal, intended as a recipient for the drops that may fall from the point of the cone. In applying this inftrument to ufe, the inverted cone is to be filled with ice or fnow, and the furface of it covered. The external furface of the veffel being thus rendered much colder than the atmofphere, the moifture which the air contains will be depofited on it; and,

and, collecting into drops, trickle down its ſides, into the veſſel beneath. The liquid thus accumulated, and loaded with the noxious effluvia exhaling from the ſoil, may now be ſubjected to chemical and microſcopical examination; and in this way, the author thinks, great light may be thrown on the compoſition of the air, in regard to its ſalubrity or unwholeſomeneſs; and, perhaps, the real cauſe of remittent fevers be diſcovered.

ART. VII. *On the neceſſity for contracting Cavities between the Venous Trunks, and the Ventricles of the Heart; on the Uſe of the Venous Sinuſes in the Head; on the wonderful Proviſion made for the Tranſition from the Fœtal to the breathing State; on Palpitation; on Death; and on Life: with Reflections on the Treatment of Animals. By* JOHN WALKER. Octavo, 46 pages. Edinburgh, 1799. DARTON and HARVEY, London.

THE little tract here preſented to us, is a tranſlation of an *inaugural theſis*, written for the purpoſes of graduation, at the Univerſity of Leyden, in the year 1799. It ſtrongly marks the author's attention to very important, and, at the ſame time, obſcure functions in the animal economy; and affords a favourable ſpecimen of his genius and application. His ideas, however, on the ſubjects here diſcuſſed, have, probably, leſs of novelty, than he ſeems inclined to imagine.

A little more attention to order and method would have much enhanced the value of the work.

ART. VIII. *Bibliotheque Germanique Medico-Chirurgicale; an Epitome of the moſt valuable Works on Medicine*

Medicine and Surgery, that are publiſhed in Germany. By — BREWER, *Phyſician to the French Military Hoſpitals, &c. &c.* Octavo. Paris, 1799.

THE German preſs furniſhes, perhaps, a greater number of publications, in the different branches of the medical art, than that of any other country in Europe. Of theſe, undoubtedly, many poſſeſs conſiderable merit, and deſerve to be very generally known. The German language, however, is but ſparingly cultivated in foreign countries; hence practitioners are, in a great meaſure, ſtrangers to the literary ſtores it contains. The object of the work before us is * to diffuſe amongſt the author's countrymen a knowledge of all the valuable publications which have made their appearance in Germany, for the laſt ten years; whether relating immediately to the practice of medicine and ſurgery, to the veterinary art, or to the modern diſcoveries in anatomy and chemiſtry. The utility of an undertaking of this kind muſt be generally admitted; and we ſhall probably be indebted to it, for our accounts of many valuable German works, which, in the original, would never have reached us.

The firſt article noticed in this magazine, is a treatiſe of M. *Hufeland*, publiſhed at Jena in 1798, and entitled, 'Remarks on the Natural and Inoculated Small-pox, as it appeared at Weimar ſince the year 1788; with a ſupplement on ſome other diſeaſes of children.'

The hiſtory of the variolous diſeaſe here given, preſents nothing that, to Britiſh practitioners, is of a very novel or intereſting nature; nor is it neceſſary, where the practice of inoculation is ſo general as with us, to notice the arguments here adduced in its favour. With regard to the other diſorders of children, M. *Hufeland* obſerves, the peculiar characteriſtics

* It is publiſhed in monthly numbers, ſix of which make a volume.

iſtics of infancy are, an habitual diſpoſition to ſleep; ſoftneſs and atony of the ſolids; a diſpoſition to viſcidity of the fluids, and an extreme ſenſibility and irritability of the nervous ſyſtem. Hence it is, that the ſmalleſt irritation is often followed by violent movements; whilſt the fibres want that true and powerful re-action, which produces a perfect criſis in their diſorders. This irritability degenerates, frequently, into concealed ſpaſm, or internal convulſion, rather than developes itſelf for the deſtruction or removal of the cauſe. In our treatment of the diſeaſes of children, this exceſſive irritability is never to be overlooked; ſince to this cauſe, more than half of them owe their origin. In convulſive caſes eſpecially, it is not ſufficient to have in view the removal of the irritating cauſe; demulcents and quieting remedies muſt be employed at the ſame time; and there are even caſes, where the general irritation is ſo exceſſive, that the removal of the exciting cauſe becomes a matter of ſecondary import only.

The author remarks, with great propriety, that nothing in the affections of children is to be regarded as trivial, or of little moment. A mere trifle, a circumſtance apparently indifferent, frequently gives riſe to ſerious conſequences. 'I have often ſeen with aſtoniſhment,' M. *Hufeland* obſerves, 'the moſt happy effects from a ſlight change of poſture, or from an impreſſion on the ſenſual organs. At no age, is the conſent of parts, or ſympathy, ſo ſtriking as in infancy. Hence the ſuperior advantages derived from vomits, external remedies, and antiſpaſmodics: impreſſions on the ſenſes, and amuſements of every kind, are here real remedies.'

The remedies moſt commonly called for, in the diſorders of infants, are vomits, abſorbents, demulcents, narcotics, and antiſpaſmodics: on each of theſe, M. *Hufeland* makes ſeveral remarks, though not of equal importance; for example, amongſt antiſpaſmodics, *ſaffron* is ſpoken of, in doſes of the ſixth or eighth

part

part of a grain, as *compofing*, without occafioning *obftruction*, and as refolving vifcofities of the lungs and lower belly. *Whey*, the author confiders as one of the beft of fedatives and correctors of acrimony; and he fuggefts fome cautions with regard to its preparation. He has caufed, he obferves, a number of children to be wholly fed with this liquor, and with the beft effects. The mode of preparation is as follows: The ftomach of a calf is to be macerated for a couple of hours in vinegar; then inflated, and hung up to dry; in which ftate it may be kept ferviceable for a confiderable length of time. A fmall flip of this, of the length of a finger, is fufficient to curdle a pint of milk. It is to be firft macerated for two hours in a cup of water, and then plunged into the milk depriv-ed of its cream, by fkimming, without fire. The milk is then to be placed on warm cinders, that it may heat gradually, without being fuffered to boil. In about a quarter or half an hour the coagulation takes place, and the whey feparates from the curd, fweet, and without the leaft trace of acidity.

The *hyofciamus* is ftrongly recommended in the treatment of hooping-cough. Of the extract of this plant, ten grains were diffolved in two drams of antimonial wine. Infants of a year old took about two grains in twenty-four hours, augmenting the dofe according to age. When the fit of coughing was exceedingly violent, and threatened fuffocation, it was often terminated, by exciting vomiting, by means of the finger, or a feather dipped in oil, and thruft into the fauces. When the inflammatory fymptoms had fubfided, and emetics had been premifed, the peruvian bark was exhibited with much advantage. In cafes of worms, *ox-gall*, given in the form of pills, is highly fpoken of, both as an anthelmintic and antifpafmodic.

A lotion compofed of two drams of *tincture of fcammony*, in half a pint of water, and applied cold

to

to the eyes, in ſcrofulous inflammation of theſe organs, was attended with the beſt effects.

The ſecond number of the *Bibliotheque Germanique* commences with a caſe of *aſcarides*, paſſed from the bladder along with the urine; as related by Dr. *Kuhn*, Phyſician at Eiſenach. (*Gazette Medicale-Allemande, May* 1795.) The moſt common ſeat of worms in the human body is, in thoſe ſituations which have a communication, more or leſs direct, with the external air, as the inteſtinal canal. But they have been found likewiſe, in ſituations, which it is difficult to account for their arriving at; this is the caſe with the urinary bladder, from which different perſons have obſerved them iſſue, both the *round-worm*, the *hydatid*, and alſo, the *aſcaris*; of which laſt, an inſtance is here furniſhed, in a child, ſix years of age, who, after ſuffering ſeverely, for ſome hours, cataleptic ſymptoms, paſſed with his urine above two hundred living *aſcarides:* after which the ſymptoms diſappeared, without recurrence. None of the worms were paſſed by ſtool, though ſtrong purgatives were adminiſtered.

The juice of *ſpurge (tithymalus)* is recommended for the cure of jaundice, by Dr. *Klebe*, of *Kahla. (ibid, June* 1798). The patient began with twenty-four drops, faſting, of the juice of the leaves ſeparated from the ſtalks; increaſing the doſe gradually to a ſmall ſpoonful. An over-doſe, however, of this acrid plant, occaſions violent vomiting and purging: caution, therefore, is neceſſary in its uſe. A ſtrong ſolution of tartarized antimony (one drachm to an ounce) ſucceeded, in the practice of Dr. *Kraul*, in removing obſtinate excreſcences on the *glans penis. (Journ. de Med. de Hufeland, vol.* 5.*)* In the ſame volume, *ſulphur* is ſpoken of as an uſeful remedy in dyſentery. A caſe is related by Dr. *Heinigke*, of a young woman, eight months gone with child, in whom a ſudden hæmorrhage took place from the vagina, and terminated fatally in the ſpace of two hours. On diſſection after death,

death, no trace of a ruptured veſſel could be found; nor had any change taken place in the *uterus* or *ovum*. *(Gazette Med. March* 1798.*)* Dr. *Pievre*, of *Altenburg*, mentions an inſtance of three children being violently affected with ſtupor and vomiting, from having eaten five or ſix bitter almonds. It is well known that a volatile oil is procurable from theſe nuts, analogous in its effects to the diſtilled water of the laurel.

A curious paper is next inſerted, by M. *Hager*, Phyſician at *Altenburg*, on the falling of the eyelids, conſidered as a prognoſtic in acute and chronic diſeaſes. 'On examining the eyes with attention,' ſays M. *Hager*, 'I perceived that the left eye was almoſt always the one affected; and that the deſcent of the eyelid was ſuch, as for the eye to remain half ſhut. It is ſeldom that both eyes preſent the ſame phenomenon at once.' Without inquiring into the cauſe of this curious circumſtance, the author contents himſelf with obſerving, that the ſame thing takes place in pleuriſies; in which the left ſide moſt commonly ſuffers.

According to the author's obſervation, when, at the commencement, and during the progreſs of acute and chronic diſeaſes, the left eye underwent no alteration, the event was favourable and ſpeedy. But when, on the invaſion of an acute diſeaſe, the left eye ſunk, as it were, to the bottom of the orbit; when it ſeemed diminiſhed in bulk, and as if ſwimming in a bath of vapour; eſpecially when it remained half-opened, whilſt the other continued ſhut, external objects at the ſame time not being perceived, the patient was in the greateſt danger, and rarely recovered. The prognoſtic was likewiſe unfavourable, when theſe circumſtances aroſe during the courſe of the diſeaſe.

In many chronic diſeaſes, the patient was obſerved to bear up well againſt febrile attacks, and general depreſſion, when the eye was not thus half-cloſed; but

but when this ſymptom appeared, the diſeaſe generally proved mortal. In chronic diſeaſes, the author obſerves, we may ſometimes remark the patient ſleeping with the left eye half ſhut, without any alarming ſymptom being preſent; in a ſhort time, however, at the moſt in eight days, theſe diſorders become dangerous, and ſoon terminate in death. It has been remarked, alſo, that perſons in good health, who, contrary to their uſual habits, ſlept with the left eye half-open, were ſoon after ſeized with ſome dangerous malady, which terminated ſometimes in mortal apoplexy.

In chronic affections, which have no determinate paroxyſms, ſuch as pains in the head, vertigo, hyſteric and hypochondriac diſorders, periodical ſpitting of blood, &c. ſeveral days previous to the attack, the left eye appears ſmall, ſunk and humid, and half open only, whilſt the other is wholly ſo. In the interval between the fits, it recovers its natural ſtate.

The ſame phenomena, M. *Hager* remarks, have been obſerved, with regard to the right eye; but much more rarely than with the left.—This curious ſubject merits further inveſtigation.

M. *Siebold*, amongſt other obſervations of leſs importance, mentions the caſe of a man, who experienced all the ſymptoms of ſtone in the bladder; as acute pains, and a great difficulty of paſſing his urine, which gave the ſenſation of ſcalding. The conſtriction at the neck of the bladder was ſo great, that it was with the utmoſt difficulty the ſound could be introduced. Theſe ſymptoms continued for ſeveral years, when, at length, the patient died. On examination of the body, not the leaſt trace of a ſtone in the bladder was obſervable; but in the left kidney was found a ſtone, covered with aſperities; and which filled entirely the pelvis of the kidney, and the ſuperior portion of the ureter. *(Bibliotheque de Richter.)*

The ſame writer relates a caſe of ganglion, the ſize of a cheſnut, ſeated on the juncture of the great toe with the metatarſal bone. The tumour was laid open, when a glairy matter was diſcharged. The tendon of the *flexor longus digitorum communis* appeared bare, which pointed out the real nature of the tumour. Lint only was applied to the wound. Conſiderable ſwelling of the whole foot took place, which was, therefore, covered with an emollient cataplaſm. In the ſpace of ſix days, the wound ſuppurated, and the expoſed tendon became covered with granulations. The wound was completely healed in about a month. M. *Siebold* obſerves, that he has treated ſeveral caſes of ganglion on the hands in a ſimilar way, and with equal ſucceſs. *(ibid.)*

A long memoir on the ſubject of the Cæſarean Operation is the next in order, extracted from *Richter's Bibliotheque de Chirurgie.* A conſiderable number of caſes of the operation is here given, collected from various ſources; of theſe many terminated favourably, though performed under circumſtances, that, in this country, would be deemed inſufficient to juſtify it.

In our next Number we ſhall notice the ſubſequent part of this collection.

ART. IX. *Medical Facts and Obſervations, Volume the Eighth.* Octavo, 244 pages. Price 6s. London, 1800. CALLOW.

THE preſent volume of Obſervations *, edited by Dr. *Simmons,* conſiſts of twenty-three articles;

* The 5th, 6th, and 7th volumes of this work were noticed in former Numbers of the Medical and Chirurgical Review. See vols. i, p. 285, ii. 182, iv. 250.

partly

partly original, but in part compiled from other publications. The firſt article is, 'A Caſe of Monſtroſity in a Child; with Phyſiological Remarks:' related by Mr. W. Simmons, ſenior Surgeon to the Mancheſter Infirmary. The preternatural formation in this caſe, conſiſted of a large maſs, having an imperfect reſemblance to the lower half of a child's body, and which was appended to the inferior part of the ſpine, by the intervention of a ligamentous ſubſtance. The child lived to the age of nine months, and then died. On examination, the monſtroſity was found to conſiſt of a maſs of fat, that contained in its centre a cloſed inteſtine, curiouſly ſuſpended over a projection of bone, and ſecured from diſplacement by its proper ligament. The cloſed inteſtine meaſured more than a foot in length, and contained a fluid ſimilar in colour and conſiſtency to the meconium found in the bowels of a new-born child.

It has been the general opinion, Mr. *Simmons* remarks, that the fœtus in utero receives nouriſhment by the mouth; and it neceſſarily followed, that the contents of the inteſtines, at the time of birth, ſhould be conſidered as the refuſe of aliment unaſſimilated by digeſtion. In the preſent caſe, however, we muſt reſort to ſome other mode of accounting for this production. The author believes, that the ſecreted fluids formed before birth, are deſtined to prevent the coaleſcence of the ſides of cavities, and to facilitate motion; and in this way he explains the formation of the meconium in the inſtance before us; conſidering it as a ſecretion from the villous coat of the inteſtine. Mr. *Simmons* afterwards ingeniouſly accounts for the production of monſters, by ſuppoſing, that they have been originally intended for twin-caſes; and that, by ſome accident, ſoon after conception, a part of one ovum becomes deſtroyed, and in this ſtate adheſion takes place between the two ova, as in other unions of ſurfaces. On this ſuppoſition, too, of the partial deſtruction of an ovum, he would account for the ex-

iſtence of teeth, hair, and other bodies, which have been ſometimes found in the ovaria, in the virgin ſtate.

2. *A Deſcription of an improved Tourniquet*: by the ſame. It is an objection to the ſcrew tourniquet in common uſe, that the ſcrew ſometimes gives way or yields, eſpecially if the thread of it be much worn. This defect Mr. Simmons propoſes to remedy, by making a tranſverſe male and female ſcrew to paſs horizontally through the upper plate of the tourniquet, ſo that the point of the male ſcrew ſhall reſt upon the inner thread of the perpendicular ſcrew.

3. *Two Caſes of the ſucceſsful Termination of Wounds that have been hitherto deemed incurable; with Obſervations*: by the ſame. The firſt of theſe was a diviſion of the internal jugular vein, in conſequence of the extirpation of a large tumour ſeated on the left ſide of the neck, and which reſembled cancer. This paſſed ſo deep as to form a connexion with the internal jugular, which was neceſſarily divided, but the bleeding from which was readily reſtrained by ligatures. The parts afterwards healed in the uſual way. The ſecond caſe was of a wound in the uterus, which, though claſſed amongſt mortal ones by the older writers, has many exceptions: a woman had laboured under *aſcites* for ſeveral years, for which the *paracenteſis* was performed, with relief of the ſymptoms. On a ſecond collection taking place, the operation was repeated; when, inſtead of water, a diſcharge of blood followed, to the amount of ſix ounces: the blood ceaſed to flow on withdrawing the canula. It turned out that the woman was five months gone with child at the time; and ſhe was delivered of a healthy infant at the uſual period, having ſuffered no inconvenience from the operation. She was afterwards again tapped for a further accumulation.

4. *Caſe of Retroverſion of the Uterus terminating in Abortion and Death: by* James Bell, *M.D. Phyſician to the Kelſo Diſpenſary.* This caſe was neglected

ed in the earlier ſtages, and when relief was afterwards ſought, the reduction of the diſplaced uterus could not be effected. The retroverſion ſubſiſted for the ſpace of ſix weeks, when abortion took place, and the patient died the following day. On diſſection, ſtrong marks of inflammation were perceptible in different portions of the inteſtinal canal, and alſo in the ſtomach. The bladder was not only highly inflamed, but in a ſtate of mortification. The uterus appeared not to have ſuffered from inflammation, of which there were no marks, except in a very ſlight degree, on the upper and back part of it.

This caſe ſuggeſts to the author ſome conſiderations of importance in the treatment of the retroverted uterus. 'Since the attention of practitioners,' he obſerves, 'has been fixed upon the retroverſion of the uterus, there have been many inſtances of its fatal termination; and in theſe caſes the death of the patient has been diſcovered to be owing to the injury done to the bladder only. By which, I apprehend, we are to underſtand, that inflammation of this viſcus had taken place, and that it had terminated partially in ſuppuration or gangrene. This information is highly important, and its truth is corroborated by the appearances in the preſent inſtance. The urinary bladder is ſuſceptible of various diſeaſes, and its organization and functions are deranged by no affection more than by inflammation. Amongſt the various cauſes that are capable of producing an inflammation in this part of the human frame, there is none of more certain operation than diſtention. When this cauſe is long-continued, therefore, and when it is conjoined with the mechanical ſtimulus of the preſſure of the uterus, the irritability of the blood-veſſels of the bladder is exhauſted, and a ſtate of debility and conſequent inflammation are induced. The inflammation, whether it has begun in the proper coats of the bladder, or in the peritoneum, is ſoon communicated to this membrane, and is rapidly extended upon this general

covering of the contents of the abdomen. The conſequences of inflammation of the bladder muſt ever be a ſubject of much anxiety; and in retroverſion of the uterus, if we are to judge from the preſent inſtance, they will inſpire the moſt ſerious dread. Whether it may not ſometimes have been removed, I cannot pronounce; but this I may ſafely affirm, that there will be almoſt an impoſſibility of procuring a cure, while the uterus is in a ſtate of retroverſion, or perhaps even when the reduction is readily effected, and every remedy is judiciouſly adminiſtered. It ſhould be our great object, therefore, to prevent the acceſſion of a ſymptom, the removal of which is ſo very problematical, and which, if continued, will ſo generally terminate in death. The judicious practitioner will carefully attend, then, to the ſtate of the bladder, and pay every attention to its frequent depletion. He will ſometimes ſucceed in preventing the diſtention, the cauſe of inflammation moſt particularly to be guarded againſt; but it is alſo true, that he will often fail of ſucceſs; and that there have been caſes to which opportunity and ſkill contributed every aſſiſtance, where death followed the continuance of the retroverſion: and if there were a poſſibility of uſing the catheter regularly, when it is neceſſary to the depletion of the bladder (a circumſtance which, in the majority of caſes, muſt be impoſſible), ſtill our apprehenſion muſt be alive while the preſſure of the uterus is continued, and while this preſſure is daily increaſed by the growth of the ovum. I apprehend, therefore, that if we are to be contented with mild remedies, in thoſe caſes of retroverſion where the ſymptoms are moderate, we are authorized in uſing the moſt active meaſures, whenever the diſtention of the bladder is conſiderable or long-continued; and when the uterus, by its increaſe of ſize, occupies entirely the cavity of the pelvis, and produces great preſſure upon the bladder. It will frequently happen, that there will be great reſiſtance to the repoſition of the uterus, and ſo much force

force may be required as to endanger an abortion. In many ſituations which occur in our paſſage through life, we are neceſſitated to ſuffer a certain evil, to procure a greater good. The accoucheur ſacrifices the life of the child to the ſafety of the mother; and here, likewiſe, morality will warrant us in hazarding the ſafety of the yet immature fœtus, when, by the acceſſion of ſo mortal a ſymptom as inflammation of the bladder, the life of an uſeful member of ſociety is endangered. The degree of riſk of a miſcarriage, ariſing from the free preſſure of the uterus, is not accurately aſcertained; but thus much is certain, that in ſeveral caſes, where erroneous views of danger produced perſevering and forcible efforts to procure the repoſition of the uterus, no abortion followed. In the preſent inſtance, the labour pains did not make their appearance till ſeveral hours after conſiderable preſſure had been employed, and had been perſevered in for a length of time.

'In purſuing this line of conduct, therefore, it would appear, that, at a very ſmall riſk of the ſafety of the fœtus, we can always have it in our power to relieve our patient from a painful and diſtreſſing complaint, and ſecure her againſt the acceſſion of a mortal ſymptom; and we ſhall have this farther encouragement, that our attempts to reduce the retroverſion will not be productive of injury to the uterus itſelf; for of the many caſes which have been the ſubjects of manual ſkill, there is no inſtance, that I know of, in which inflammation, or other bad conſequences, followed judicious force applied to this organ.'

5. *Some Obſervations relative to the Climate and Diſeaſes of Sierra Leone: By* Thomas Maſterman Winterbottom, *M.D.* From the account here publiſhed it appears, that remittent and intermittent fevers conſtitute the chief bulk of the diſeaſes at *Sierra Leone*; and that the reſt are chiefly diſorders ariſing from a morbid increaſe of irritability of the conſtitution, or of particular parts. The author has given a conciſe view of

the diſeaſes which prevailed during the courſe of a whole year, diſtinguiſhing the different months in order. Africa has proved the grave of many Europeans; but a great, or, perhaps, the chief part of this mortality, Dr. W. obſerves, may be attributed to cauſes independent of the general inſalubrity of climate; ſuch as intemperance, and imprudent expoſure to the viciſſitudes of weather. When theſe are avoided, and attention is paid to ſituation, it appears, from experience, that health may be retained in Africa, as well as in other parts of the world.

(To be continued.)

ART. X. *Conſiderations regarding Pulmonary Conſumption. By* THOMAS SUTTON, *M. D. Phyſician to the Forces.* Octavo, 116 Pages. Price 3s. London, 1799. ROBINSONS.

THE ideas entertained by the author of the pamphlet before us, reſpecting the diſeaſe in queſtion, are peculiar, and call, therefore, for ſome notice. Having obſerved in certain caſes of conſumption, that the pulmonary ſymptoms were exceedingly mild, and, in his opinion, inadequate to account for the great fatality of the diſeaſe, he conceives we muſt reſort to another cauſe for the explanation of this. He found, in ſome inſtances, that the firſt ſymptoms of morbid affection were in the bowels; and that by degrees the diſorder became a confirmed *phthiſis pulmonalis*. Hence he was led to ſuſpect the emaciation and debility to be induced by ſome diſeaſe of the abdominal viſcera; to wit, obſtruction of the meſenteric glands. 'By this obſtruction,' he obſerves, 'a deficiency of the gluten is occaſioned by the nouriſhing part of the food being prevented from arriving in the blood-veſſels; and ſo much of the ſolid ſubſtance of the body is abſorbed, as to leave that ſource

source of supply incompetent to furnish a proper quantity for the purposes of life.' Again, 'the ultimate cause of the deaths of patients in consumption, in my view of the disease, when they happen without any urgent pulmonic symptoms, is, the decrease of the stimulating quality of the blood, in so much as, at last, not to be capable of continuing the circulation. For, in the last stage of the disease, I have seen blood drawn, which separated more serum than I have observed in any other cases; and therefore I presume, that, at the very last, there is not a proper quantity of crassamentum to absorb a sufficiency of oxygene, to continue to excite the circulation.'

In proof of this theory, the author further remarks as follows: 'From my own observations, as well as the concurrent testimonies of authors, it appears to me evident, that mesenteric obstruction is often connected with pulmonary consumption; that *tabes mesenterica* observes much the same progress as pulmonary consumption, in like manner accompanied by hectic fever, which I have seen in other cases besides those related: and therefore I am led to conclude, that the same cause of death, which is acknowledged in the former disease, may exist in the latter; and as there appears, in many cases of pulmonary consumption, an affection of the mesenteric glands, this affection, adequately accounting for the most important symptom, emaciation, I conclude, that some such affection is the principal agent in most cases of this disease. That its action is previous to any material disease of the lungs, is evinced by pulmonary consumption succeeding diseases of the bowels, which may affect the mesenteric glands; as was the fact in the first case, as well as in the cases of the soldiers whose bodies were inspected, and from the frequency of the disease in the last stage of protracted dysenteries, and other chronic complaints of the abdominal viscera. That some disease exists, also, before the lungs are much affected, is evident by the leanness and languor preceding pulmonary

monary confumption with tubercles, according to the hiftory of the difeafe by Dr. Cullen, and others, which may be accounted for by fuppofing an obftruction of the mefenteric glands to have taken place, which obftruction is allowed by authors, in the progrefs of the difeafe, frequently to happen.

'Hence it appears to me, that *phthifis pulmonalis* is caufed by a difeafe in the mefenteric glands; and that the tubercles in the lungs, and fome other of its fymptoms, are excited by fympathy.'

The indications of cure laid down by the author, are confonant to the view of the difeafe now given; and confift in the removal of mefenteric obftruction by different means; the chief of which are, emetics and purgatives, efpecially the former.

It feems to us, that the theory of confumption here propofed, is founded on a partial and contracted view of the difeafe. If the hectic fever, the emaciation, &c. depended, as the author fuppofes, on mefenteric obftruction, then this fhould be found an univerfal concomitant of *phthifis pulmonalis:* but this is contrary to fact. Confumption of the lungs arifes during the progrefs of many difeafes, befides mefenteric affection, to which it feems to bear no other relation, than its moft frequently taking place, in common with this, in a fcrofulous habit of body.

ART XI. *Tranfactions of a Society for the Improvement of Medical and Chirurgical Knowledge. Illuftrated with Copper-plates.* Octavo, 378 Pages. Price 7s. London, 1800. JOHNSON.

A CONSIDERABLE interval has elapfed fince the publication of the former volume * of the

* It made its appearance fome time previous to the commencement of the Medical and Chirurgical Review.

Tranfactions

Tranſactions of this Society, a work which ſtands almoſt unrivalled in the value and importance of its contents. The preſent collection contains a conſiderable number of highly intereſting facts and obſervations, relating to various parts of medical and chirurgical practice, and which demand from us particular notice.

The firſt article is, ‘ Obſervations on the Caſe of a Woman, who died with a Fœtus in the Fallopian Tube: by *John Clarke, M.D.*’ In this caſe, pains reſembling labour came on at the uſual period of pregnancy, and which, after having continued for ſome days, went off, and never returned. Some months now elapſed without any material alteration, except that of the general health of the patient declining. At length, ſhe began to feel conſtant pain near the middle, and towards the lower part of the cavity of the abdomen. This was ſucceeded by a ſwelling near the navel, which increaſed till it formed a tumour, the diameter of which was from three to four inches. After ſome time ulceration took place on the ſurface of the tumour, from which iſſued a conſiderable quanty of fetid, ſanious fluid. The opening gradually enlarging, ſeveral bones of a full-grown fœtus were diſcharged through it, as ſome of the ribs, vertebræ, the temporal bones, &c. Whilſt theſe bones were coming away, her ſtools became very offenſive, reſembling in their ſmell the diſcharge from the ſore at the navel. Soon after this, the woman began to loſe her fleſh and ſtrength; her pulſe became weak, ſoft, and frequent; ſymptoms of great irritation ſupervened, and at laſt ſhe was cut off.

On examination after death, the uterus was nearly twice as large as when unimpregnated, and thicker in its ſubſtance. In its cavity nothing remarkable was found. The right fallopian tube led to a cyſt, in which were contained the remainder of the bones, not diſcharged through the aperture at the navel. The anterior part of the cyſt was attached to the peritonæum,

tonæum, fo that there was no communication between it and the general cavity, whilft its pofterior part was connected with the inteftinal canal, into which an opening was formed by ulceration.

Some obfervations are fubjoined to the cafe, by the author: he remarks, that whilft the fœtus continued alive, its prefence in the fallopian tube conveyed no particular fenfation, or inconvenience to the mother, more than if it had been in the cavity of the uterus; fince it does not appear that fhe was aware of any peculiarity in this pregnancy, more than in her former ones. Many of the defcribed cafes of ventral conception, Dr. Clarke fuppofes, may have been really of this kind at firft; the fallopian tube burfting during the growth of the ovum, and the placenta continuing to adhere to the inner furface of the tube.

2. *Account of a Cafe in which Death was brought on by a Hæmorrhage from the Liver: by* Gilbert Blane, M.D. F.R.S. &c. The fubject of this cafe was a delicate boy, eight years of age, who had a feverifh attack, which lafted about a week, attended with flight pains, which he referred to his breaft and ftomach. At this period he was feized with a fevere pain, which he referred to the left hypochondrium. This continued five or fix hours, and he then became fuddenly faint, and, lofing all fenfe and motion, was thought to be in a fwoon; but from this he never recovered. On laying open the cavity of the abdomen, a large quantity of coagulated blood was difcovered, covering the whole left fide of the inteftines. In exploring the fource of this, feveral fiffures were obferved in the left lobe of the liver, which were about two thirds of an inch in length, whence the blood had undoubtedly flowed; for they were found to lead to a cavity in the fubftance of the lobe of about the fize of a pigeon's egg, and full of blood. The peritonæum, on the furface of that part of the liver which was near one of the fiffures, was raifed from the liver like a blifter, full of coagulated blood. Thefe appearances were on the

lower

lower ſubſtance of the lobe; but on the upper ſurface of the ſame lobe there was one fiſſure, round which was a ſmall collection of blood, between the peritonæum and the ſubſtance of the liver, and it led to a ſmall bloody cavity near the ſurface of the liver. There was no appearance of increaſed vaſcularity, tumefaction, or other marks of inflammation or abſceſs in the liver, but the whole ſubſtance of it was more ſoft and tender than natural. Nor was there any accidental injury to which the rupture might be referred. It ſeems moſt probable, therefore, Dr. Blane obſerves, that the rupture and conſequent hæmorrhage were owing to the weak ſtructure of the liver, which correſponded with the general weakneſs of this young perſon's frame.

3. *An Account of the Croup, as it appeared in the Town and Neighbourhood of Cheſham, in Buckinghamſhire, in the Years* 1793 *and* 1794: *by* Henry Rumſey, *Surgeon at Cheſham.* This is an intereſting narration, both from the importance of the ſubject, and the manner in which it is related. The ſubjects of the diſeaſe were children from within the firſt to the fourteenth year. It attacked very different conſtitutions, as well the pale and phlegmatic, as the robuſt and healthy. From the accurate hiſtory of the ſymptoms here given, we tranſcribe the following.

'At firſt the cough was dry; but in the courſe of the diſeaſe, viz. by the third day, or ſooner, the paſſage of the air was obſtructed by viſcid matter in the trachea, ſome of which was occaſionally thrown up by cough or retching; and according to the quantity thrown up reſpiration was more or leſs relieved. Several children brought up portions of a film, or membrane of a whitiſh colour, reſembling the coagulated matter which was found in the trachea of thoſe children whoſe bodies were opened. This was thrown off by violent coughing or retching; and the efforts made to diſlodge it were often ſo diſtreſſing, that the child appeared almoſt in a ſtate of ſtrangulation.

gulation. This was ſucceeded by an abatement of all the ſymptoms, until a freſh quantity of the ſame ſubſtance was formed; when the diſtreſs recurred as before.

'Moſt of the caſes which occurred in November, and afterwards, were attended with inflammation and ſwelling of the tonſils, uvula, and velum pendulum palati; and frequently large films of a white ſubſtance were formed on the tonſils. The ſwallowing was uſually leſs impeded, than might have been expected from the degree of diſeaſe which exiſted in the throat. Dr. Cullen obſerves, "when the internal fauces are viewed, they are ſometimes without any appearance of inflammation, but frequently a redneſs, and even a ſwelling, appear." (See Firſt Lines.) But much more diſeaſe in theſe parts accompanied the croup, in many of the caſes which occurred in this neighbourhood.

'By the end of the ſecond, or on the third day, ſymptoms of affection of the ſyſtem took place; as white tongue, thirſt, increaſed heat, and frequent pulſe; and the diſeaſe advanced rapidly, not merely from violent general affection, but from the influence it had on the organs of reſpiration; the difficulty of breathing becoming now very diſtreſſing, the countenance being often fluſhed, attended with great inquietude, and a continual inclination to change from place to place. The child at the ſame time eagerly put its finger into its mouth, as if to pull away ſomething which ſtuck in the paſſage.

'The ſenſes were retained throughout the diſeaſe, until the child was at the point of death, which was preceded by the red fluſhing of the face changing to a livid hue; the hands at the ſame time acquired the ſame colour. The patient was cut off apparently by ſuffocation.

'In the firſt caſe, the diſeaſe terminated fatally on the third day. None of the patients that I have attended have died at an earlier period. Although the patient

patient has been ſaid to have ſometimes died within twenty-four or thirty hours after the diſeaſe began, yet I have found upon cloſer examination, that the diſeaſe had exiſted longer, and that the attack had been careleſsly dated from the time that ſevere ſymptoms appeared. A more ſpeedy determination of the croup is, however, mentioned by ſome phyſicians who have written on the diſeaſe. Where it has proved fatal, I have uſually ſeen it run on to the fourth or fifth day, or even later. Where conſiderable portions of the membranous film, formed on the ſurface of the trachea, were thrown up, life was protracted ſtill longer, in one caſe even to the tenth day.

'The affection of the ſyſtem was different in degree, and irregular in its progreſs. It uſually increaſed towards night. In ſome of the earlier caſes this wore rather an inflammatory appearance, and the ſkin was hot and dry; afterwards, however, this was not obſervable, and the ſkin was often relaxed and moiſt throughout the diſeaſe.

'This morbid affection of the ſyſtem in the croup appears to be ſymptomatic. I have not ſeen any danger ariſing merely from theſe ſymptoms, which commonly took place in a degree proportionate to the ſtate of reſpiration. The danger is not to be eſtimated by the general ſtate of the body; for there may be imminent danger, although hardly any ſymptoms of general diſeaſe have been obſerved. It is particularly neceſſary for thoſe practitioners who have ſeen but little of the croup to attend to this. If they expect to meet with a conſiderable affection of the ſyſtem, they will not be aware, that ſo formidable a diſeaſe has begun its progreſs; ſince, for the firſt day or two, the child has only a ſlight cough and hoarſeneſs, is in good ſpirits, perhaps even running about the room, and enjoying its amuſements; many inſtances of which I have known.'

'It appears to me that the croup is an inflammation of its own kind. If it conſiſted in common inflammation,

mation, we might expect to find the ſame appearances (that is, the ſame kind of concretion on the ſurface of the trachea) every day, as its mucous membrane is ſo frequently the ſubject of inflammation attended with an increaſed ſecretion. The matter, however, of which this ſubſtance is formed, poſſeſſes different properties from thoſe of the mucus which is thrown out upon the membrane of the noſe, or of the trachea, in common catarrhal affections.

'I think it probable, that the film which we find in the croup is not formed by a ſecretion from the mucous glands, but is an exſudation from the exhalant arteries. Upon this principle, we can more eaſily account for ſuch film not being found in common catarrhal affections, in which the mucous glands are, perhaps, more the ſeat of the diſeaſe. It is, therefore, analogous to the inflammatory exſudation from the inflammation of other internal membranes, firſt deſcribed by the late Dr. Hunter. The Croup has been ſometimes thought infectious; but I have not been able to form a decided opinion upon this point. Some circumſtances render it probable, as two and ſometimes three children in the ſame family have been ſeized with it. But, on the other hand, I have at different times ſeen two or three in a family eſcape, while one or two of the others have died of it, without any pains being taken to keep thoſe who were in health from the ſick. When a diſeaſe is epidemic, it is ſometimes difficult to determine whether it be communicated by infection; or whether ſeveral people have the diſeaſe in conſequence of their being expoſed to the ſame exciting cauſes. It is rather remarkable, that although there were between twenty and thirty children in our work-houſe, only one had the diſeaſe. Upon the whole, I met with above forty caſes. The croup has but rarely made its appearance in this neighbourhood. My father, who has been in conſiderable practice here above forty years, does not recollect ſeeing more than eight or ten caſes.'

Seventeen

Seventeen caſes of the diſeaſe are particularly deſcribed, as illuſtrating the method of treatment which was employed. We have ſtill reaſon to lament the inſufficiency of every plan that has been ſuggeſted for its relief. ‘ The event of theſe,’ Mr. Rumſey remarks, ‘ and of many more caſes, which I afterwards met with, convinced me, that the adage “ ſi quid movendum, principio movendum,” was in no inſtance more applicable, than in reference to the preſent diſeaſe; yet the trifling appearance of the croup in its early ſtage ſo rarely excited the apprehenſions of patients, that I had very little opportunity of fairly trying the effect of medicine, until the diſeaſe had advanced to ſuch an height as too frequently to baffle all our exertions. The antiphlogiſtic plan (particularly bleeding from near the part), if adopted at the beginning of the diſeaſe, appeared to me the mode of proceeding which afforded the moſt hopes of ſucceſs. But when I found ſo much diſeaſe about the tonſils, as I have already deſcribed, bleeding from any large vein appeared to me altogether improper; and the more ſo, when I conſidered the kind of diſeaſes which at this time we met with in the country. In two caſes, where nothing beyond ſlight inflammation and ſwelling of the tonſils accompanied the other ſymptoms, having been conſulted pretty ſoon, I applied to one patient ſix, and to the other, three leeches. In converſation with my neighbour Mr. *Suthery*, an ingenious and liberal practitioner, he obſerved to me, that in September he loſt a patient in the croup, and deſired the mother, that if any of the other children ſhould have any appearance of the ſame complaint ſhe would acquaint him immediately; in a few days after, a boy in the family, ſix years old, was ſeized with the croup, and Mr. Suthery was called in upon the ſecond day of the diſeaſe: he bled the child, and proſecuted the antiphlogiſtic plan; but with this treatment he died.

 ‘ I uſually

'I uſually found my patient in a ſituation, in which the only rational indication of cure was to promote the expectoration of that matter which was accumulating on the ſurface of the trachea. This I endeavoured to do, by giving gum ammoniac, ſquills, and other expectorants; or ſmall doſes of ipecacuanha; or an antimonial preparation, both in order to promote this intention, and likewiſe to keep up a determination to the ſkin; having previouſly given an emetic, which was repeated in the ſpace of twenty-four hours, if an opportunity offered.

'A bliſter, likewiſe, applied either to the throat or breaſt, was a part of the uſual practice which I followed for ſome time; but not perceiving the leaſt advantage from this application, after repeated trials I diſcontinued it. Amongſt other things the warm bath was made uſe of by many patients, and repeated; ſometimes fomentations to the throat and breaſt, with emollient cataplaſms, were tried: and likewiſe, where it could be managed, the vapour of warm water was inhaled, by means of Mudge's Inhaler.

'The ordinary mode of treatment proving inefficacious, I thought myſelf juſtified in ſtepping out of the common track; and therefore gave the cicuta in ſeveral inſtances, but with no better effect. Where the feel of heat did not forbid, and ſpaſmodic affection accompanied the other ſymptoms, I gave æther in ſmall doſes, and repeated it; but my efforts did not yet avail. Dr. Cullen ſays, "Although we ſuppoſe that a ſpaſm of the glottis is often fatal in this diſeaſe, I have not found antiſpaſmodic medicines of any uſe." I had at length the ſatisfaction of ſeeing a child recover, after taking the *tinct. ſcillæ* and *vin. ipecacuanhæ*, in ſuch doſes as to excite vomiting, which were repeated every four, five, or ſix hours. Indeed, I found vomiting the only means of diſlodging the matter which was collected in the trachea; for children are ſo averſe to expectorate, that if they are prevailed on to take ſuch medicines as have a tendency to produce this

this effect, they will endeavour as much as poſſible to check this evacuation.—I adopted the ſame practice in ſeveral inſtances afterwards, but could only procure temporary relief, which was in proportion to the quantity of mucus brought up.—In converſation with my brother on the ſubject, he mentioned, that Dr. *Ruſh* had recommended calomel in the croup. I was highly gratified with this information, and determined to try the effects of calomel the firſt opportunity. Yet as the Dr. recommends it to be "repeated in ſmall doſes every day," it is pretty evident that the diſeaſe appeared in a milder form in Philadelphia than it has here: for before I ſaw the patient, the diſeaſe was ſo far advanced, that, had I confined myſelf to this mode of adminiſtering this medicine, there would have been no chance of repeating the doſes many times.

'However, I gave the calomel in what I thought the moſt efficacious manner, and had the ſatisfaction of ſeeing ſome patients recover under ſuch treatment. I have not had ſufficient experience to determine whether it is ſo powerful an antidote in the croup, as the author, whoſe practice I adopted, ſuppoſes. Having ſtated all the caſes in which the mercurial treatment was fairly tried by me, I muſt refer the reader to them, and leave him to draw his own concluſions.'

It appears that mercury was exhibited by the author in ſix caſes, all of which recovered. But it ſhould be obſerved, that ſome recovered when mercury was not adminiſtered, or in ſuch quantity as not to produce any effect, which was the caſe with ſome of theſe; and in two patients, under the care of the author's brother, it was given unſucceſsfully. Moreover, the diſeaſe was leſs ſevere towards the end of the epidemic conſtitution, which was the period when the uſe of mercury was adopted.

4. 'The Caſe of a young Woman who poiſoned herſelf in the firſt Months of her Pregnancy: by Thomas Ogle, Surgeon, in London. To which is

 added;

added, an Account of the Appearances after Death: by the late John Hunter.' The poiſon employed in this caſe was arſenic, and which produced the uſual ſymptoms and appearances in the ſtomach after death. On the internal ſurface of the ſtomach, near the cardia, a portion of the villous coat, about the ſize of a crown piece, was partly deſtroyed, and of a dark red colour, with a regularly defined edge; and ſome of the arſenic adhered to different parts of its ſurface.

But the caſe is chiefly intereſting, from the examination which was made of the organs of generation at this early period of geſtation. From different circumſtances it was evident, that the time from conception could not exceed a month, and was probably within it. The obſervations of Mr. Hunter are contained in the following account.

Both ovaria being ſlit open, there was found in the left a corpus luteum. The arteries of the uterus were injected, and the ſmaller veſſels were filled to ſo great a degree of minuteneſs, that the whole ſurface became extremely red.

The *cervix uteri*, and *os tincæ*, were of their natural ſize; but the body, or that portion of the uterus next the fundus, was a little enlarged, and more prominent, externally, in the middle. The ſpermatic veſſels were alſo enlarged. On cutting into the ſubſtance of the uterus, it had more of a laminated ſtructure than in the unimpregnated ſtate: this appearance of lamellæ appeared upon examination to be formed by veins ſomewhat enlarged, compreſſed, and tranſverſely divided, and terminated on the internal ſurface in a pulpy ſubſtance. The blood-veſſels of the uterus paſſed into, and ramified upon, this pulpy ſubſtance, which was continued acroſs at the cervix uteri, ſo as to make the cavity of the uterus a circumſcribed bag; and at this part the pulpy ſubſtance was ſo thin as to reſemble the retina.

This cavity had a ſmooth, but irregular internal ſurface; and the pulpy ſubſtance upon which it was formed

formed was evidently blood coagulated, and varied in its thickneſs in different parts. Upon a longitudinal ſection of the uterus, the poſterior part of the coagulum, which was the thickeſt, was nearly half an inch; where it terminated towards the cervix it was pendulous and unattached. There were alſo ſeveral looſe proceſſes, all turned towards the cervix, one of them very thin, as broad as a ſilver penny, and only attached by one edge to the *fundus* near the opening of the right fallopian tube.

On ſlitting open the fallopian tubes, the coagulum was found to paſs ſome way into them, and to extend more than half an inch on the left ſide which had the corpus luteum. The coagulum was thickeſt at the orifice of the tube, and there adhered to the inner ſurface for the eighth part of an inch; beyond which it became ſmaller, and terminated in a point. In the left tube, the coagulum was in two places coiled, or folded upon itſelf, as if thrown back by the action of the tube. The portions of the coagulum at the orifices of the tubes were hollow.

When the inner ſurface of the cavity of the uterus was examined with a magnifying glaſs, it was found extremely vaſcular, and dotted with innumerable whitiſh ſpots, too ſmall to be ſeen by the naked eye.

In the examination of the uterus, and fallopian tubes, as Mr. Hunter's chief object was the detection of the embryo, no precaution was omitted, which could be deviſed, to prevent it from being overlooked or deſtroyed.

The uterus was opened in a baſon of clear water; the inciſion was conducted with great circumſpection, and very ſlowly continued till the whole of the cavity was expoſed: every part of the internal ſurface was minutely examined with magnifying glaſſes; but, in no ſituation, was there any thing reſembling an embryo to be found.

The preſence of a *corpus luteum*, the enlargement of the uterus, the newly formed vaſcular membrane,

or *decidua*, lining the cavity, and the hiſtory of the caſe, ſufficiently prove conception to have taken place; and the embryo being no where detected by an examination ſo accurate, and conducted by an anatomiſt ſo ſkilful in minute inveſtigation, would induce a belief, that the fœtus had not been ſufficiently advanced to take on a regular form.

From this account it would ſeem, that certain changes in the uterus not only take place previous to the reception of the fœtus, but that the fœtus does not acquire a viſible form for ſome time after theſe changes have been made.

(To be continued.)

ART. XII. *Traite complet d'Anatomie, &c.* i. e. *A Complete Treatiſe of Anatomy; or a Deſcription of all the Parts of the Human Body. By* A. BOYER, *Profeſſor of Anatomy and Surgery at Paris.* Vol. 3d. Price of the three firſt volumes 15 francs (the 4th. is ſaid to be in the preſs). Paris, 1799.

THE work here announced is ſaid to be remarkable for the clearneſs and preciſion with which it is written, as well as for the great number of important and original obſervations which it contains. Its author ranks amongſt the moſt diſtinguiſhed anatomiſts of his country.

MISCEL-

MISCELLANEOUS.

WE lately mentioned, curſorily, the prevalence of Ophthalmia in Egypt. A memoir of ſome length on this ſubject has been furniſhed by M. *Bruant*, a Member of the late Egyptian Inſtitute, and Phyſician in Ordinary to the Army. Amongſt the cauſes particularly exciting theſe affections, the action of exceſſive heat and light is eſpecially inſiſted upon. To this is added, that ſcorching nitrous duſt, which the winds are conſtantly raiſing in clouds in the atmoſphere. Theſe cauſes unite in making the ball of the eye a center of irritation, and conſequently of inflammation. As the operation of theſe cauſes is conſtant, and varies little at any ſeaſon of the year, the diſeaſe which they produce prevails at all times, but principally during the three months which precede the inundation of the Nile.

Other ſpecies of ophthalmia are attributed to conſtitutional cauſes; as bilious ſordes in the *primæ viæ*, or a general nervous debility. In the laſt kind, the conjunctiva ſwells and becomes puffy, and riſes above the tranſparent cornea, which then appears as if ſunk in. It then becomes covered with a whitiſh matter, perfectly reſembling pus, which collects conſtantly at the inner angle, eſpecially during the night. By degrees this matter acquires a purpliſh tinge, and at laſt returns to its natural colour and appearance. Sometimes ſmall ulcers cover the whole extent of the albuginea and cornea.

The author does not point out any peculiar mode of treatment; which, of courſe, muſt vary according to the particular nature of the affection. In the latter ſpecies, tonics, internally, with bliſtering behind the ears, are adviſed. The Egyptians uſe the actual cautery to this part, when the complaint is obſtinate.

 The

The diſorder often cures itſelf by the ſpontaneous efforts of Nature; and one may ſay with truth, the author obſerves, that nothing ſo much ſtands in the way of a cure, as a multiplicity of remedies; eſpecially external applications. (*Memoirs relative to Egypt.*)

The *Natron* lakes of Egypt are a curious circumſtance in the natural hiſtory of that country. Theſe lakes are a vaſt laboratory, where Nature prepares an immenſe quantity of ſoda, the uſe of which, under the name of natron, goes back to the earlieſt records of hiſtory; and, for little more than the expenſe of collecting and carriage, the demands of the whole world might be hence ſupplied. There are found in the lakes here mentioned, ſalts that differ from each other, even in parts of the ſame lake that have little communication with each other. Theſe are in general muriate of ſoda, carbonate of ſoda, and a little ſulphate of ſoda; but in various proportions, ſo that the carbonate of ſoda prevails in ſome, and the muriate in others.

The lakes are in part ſurrounded with reeds. The ſoil which ſeparates them, and which forms the valley, is in general covered with incruſtations, compoſed principally of maſſes of carbonate of ſoda of greater or leſs purity. With reſpect to the origin of the ſoda thus found, M. *Berthollet* conjectures, that it owes its birth to the decompoſition of the marine ſalt with which the neighbouring country abounds. He is led to this opinion from obſerving, that the ſoda was found in many places ſurrounded with water that contained only muriate of ſoda, and upon a ſoil impregnated with the ſame.

With reſpect to the circumſtances which determine the decompoſition of ſea-ſalt, M. *Berthollet* obſerves, that if the ſoil is too argillaceous no natron is found at the ſurface, but only ſea-ſalt. If it is too ſiliceous, no ſalt at all is yielded, the rains having waſhed away every thing ſaline. The ſoil in which this decompo-
ſition

ſition of ſea-ſalt is taking place, always contains a conſiderable portion of carbonate of lime, and is conſtantly found in a moiſt ſtate. It appears, therefore, certain, that it is the carbonate of lime which occaſions the decompoſition of the muriate of ſoda, with which it is made to come in contact by means of the heat and moiſture. When the natron which covers any ſoil has been carried off, it requires, it is ſaid, four years for its reproduction, if the ſeaſons have been moiſt, and ſix if they have been dry.—The explanation of this production, which is oppoſed by ſome common facts in chemiſtry, is intended by the author as the ſubject of a future memoir. *(Ibid.)*

The purity of the atmoſphere, in other words, the quantity of oxygen it contains, has been ſuppoſed to differ greatly in different ſituations and climates. Thus it has been ſaid, that the air of hot climates, as of the Weſt Indies, contains no leſs than $\frac{67}{100}$ of oxygen in its compoſition*. It appears, however, that the difference between Paris and Grand Cairo, in this reſpect, is extremely ſmall; the quantity of oxygen in the air of the former, amounting, according to the experiments of M. *Berthollet,* to rather leſs than 22 parts in the hundred; whilſt at *Cairo,* it appeared to be ſomewhat above 22; and even this trivial difference may be accounted for, by the very dry air of Cairo ſaturating itſelf with water during the experiments, and thereby experiencing a ſlight dilatation, as every ſubſtance, during its ſolution in any gas, aſſumes the aeriform ſtate.

The ſmall proportion of oxygen contained in atmoſpheric air, according to theſe experiments of M. *Berthollet*, deſerves notice. Several eminent chemiſts and natural philoſophers have ſuppoſed a much greater proportion of oxygen to be preſent, viz. twenty-ſeven hundredths, or nearly one third. And M.

* See Medical and Chirurgical Review, vol. vi. p. 361.

Humboldt

Humboldt has made the proportions of oxygen vary, from 23 to 29, in the 100. Theſe different eſtimates may be accounted for, M. *Berthollet* thinks, from the imperfection of eudiometrical experiments. Since the diſcovery of the compoſition of atmoſpheric air, various attempts have been made to aſcertain the relative proportion of the oxygenous and azotic gaſes contained in it. Advantage was firſt taken of the property of nitrous gas to abſorb oxygen, noting the diminution of volume in the air thus examined as the teſt of its purity. Nitrous gas, however, will not give the ſame reſult without great care in its preparation, as *Ingenhouz* has long ſince ſhewn.

Liquid alkaline ſulphuret preſents the double advantage, of giving at the ſame time the relative proportions of the gaſes preſent in the air ſubmitted to experiment, and the abſolute quantity of oxygen gas; for the whole diminution is here due to the oxygen abſorbed. The only inconvenience of this method is, the ſlowneſs with which the ſulphuret acts; requiring ſeveral days, eſpecially at a low temperature.

Inſtead of theſe means of determining the proportion of oxygen in atmoſpheric air, M. *Berthollet* propoſes the gradual combuſtion of phoſphorus. For this purpoſe, a cylinder of phoſphorus, fixed to the end of a glaſs rod, is to be placed in a narrow jar, containing the air under examination; if the temperature of the external air is conſiderable at the time, the jar ſhould be completely immerſed in water, to prevent the melting of the phoſphorus; for the evaporation from the ſurface of the water keeps it conſtantly at a temperature a few degrees lower than that of the atmoſphere. As ſoon as the phoſphorus is introduced into the air, a cloud is immediately formed, which deſcends, and mixes with the water. When the operation is completely finiſhed, the cloud, which is luminous in the dark, will have diſappeared, and no more ſenſible abſorption will take place. If the experiment be made with a narrow tube, it requires no more than two

two hours for its completion. The air to be ſubmitted to the teſt, is firſt meaſured in a graduated tube; and when the operation is concluded, the remaining gas is meaſured in the ſame tube, with the accuſtomed precautions; making the neceſſary corrections for the change of temperature, or of atmoſpheric preſſure, which may have taken place during the trial. *(Ibid.)*

Though the green matter which vegetates in and on the ſurface of water, has already been the object of much reſearch to philoſophers, M. *Sennebier* has thought it worthy of being ſubjected to a new examination. He informs us, that it was known to *Lahire*, *Leuenhoeck*, and *Homberg*. *Adanſon* gave it the name of *tremella conferva gelatinoſa, omnium tenerrima, minima, aquarum limo innaſcens*. *Prieſtley, Ingenhouz, Sennebier, and Girod-Chantram,* made a variety of experiments and obſervations on this ſingular ſubſtance. *Felix Fontana* believes it to be a kind of *polypier*, that is, the habitation of ſmall inſects which produce it, as other inſects produce coral. This is the opinion alſo, of *Ingenhouz* and *Girod-Chantram*; but Sennebier is of a different opinion. Having made inquiries reſpecting the manner in which this green matter is produced in the water, he found, 1. That it was never produced in water kept in the dark. 2. That a great deal of time was requiſite to produce it in diſtilled water, and that it was neceſſary that the water ſhould be long expoſed to the air. 3. That water into which he had put earth, was more favourable than any other to the production of this green matter. 4. That none of it was formed in a veſſel of water covered with a ſtratum of oil*. To aſcertain the manner in which it is formed, M. *Sennebier* put glaſſes, on which ſome of the

* When theſe facts are attentively conſidered, they render the opinion of M. *Girtanner*, in the memoir of which an account is given above, extremely improbable, viz. that the production of this green ſubſtance is a mere chemical operation.

green

green matter had been, into veſſels of water; and he perceived in the water, ſome days after, animalculæ, without green matter. The green matter next appeared, and he ſaw animalculæ penetrate into it, and give it movement. At other times, he ſaw the green matter without animalculæ. He obſerved in this green matter a very diſtinct pellicle, ſimilar to that of vegetables. This pellicle appeared to him to abſorb the carbonic acid gas which is in the water; to decompoſe it; to abſorb the carbon; to nouriſh itſelf; and to ſuffer the oxygen gas to be diſengaged. This pellicle appeared to be the fundamental body of the green matter; it is a kind of net-work, or tiſſue. He obſerved alſo, with great care, the animalculæ generally found in the green matter; and it appeared, that they were not different from thoſe of common infuſions. This much however is certain, that the ſame animals are not always found in the green matter. He mentions the experiments of *Muller*, of infuſion-animalculæ; and ſhews, that the ſame kind, almoſt, are found in the green matter. He ſhews further, that the green matter, examined in the microſcope, exhibits nothing that can be conſidered as a polypier, or neſt of ſmall animalculæ. From all theſe obſervations he concludes it to be probable, that the green matter is a real vegetable, analogous to the *ulva inteſtinalis*, or *noſtoch*; that the animals moſt frequently found with it do not belong to it; ſince the green matter may exiſt without animalculæ; and that theſe animalculæ are often found without the green matter: ſo that, in every reſpect, the green matter and animalculæ, appear to be abſolutely independent of each other. The green matter, therefore, muſt be a plant on which the animalculæ feed.

The green matter, kept in water in an obſcure place, ſeems to diſſolve. It becomes firſt gray, then white, and gives no more air when expoſed to the ſun. A chemical analyſis of it proves, alſo, that it is a vegetable; for he extracted from it, gum, reſin, and a portion

portion of green colouring matter; a ſmall quantity of ammonia has, indeed, been procured from it; but ſeveral plants, when analyſed, give the ſame; and beſides, this green matter almoſt always contains the remains of animalculæ and other animals, which might have furniſhed ammonia.

A method of treating ſpecimens of plants, by which the fine colours of the leaves and petals may be preſerved entire, has been lately pointed out by Mr. *Stackhouſe*, in the *Linnean Tranſactions*, *v.* 5. It conſiſts in immerſing the plant, flowers, leaves, and ſtalk, in a ſaturated ſolution of alum, drying it afterwards thoroughly between folds of blotting paper, and excluding carefully at the time both light and air. The ſpecimen is then to be ſtuck on paper in the uſual way. By this operation, not only the colours are preſerved; but the eroſion of inſects is, likewiſe, prevented.

M. *Léveillé*, Member of the French National Inſtitute, has made ſome curious obſervations, on the ſtructure of the egg in oviparous animals; and on the manner in which nutrition is performed in the young animal. According to him, the egg conſiſts of the cicatricula, the yolk, three diſtinct albumens, an abſorbing canal, five membranes, and ſanguiferous and ſerous veſſels: he remarks, that there exiſts a communication between the albuminous maſs and the capſule of the yolk, by means of the abſorbing canal: that the volume of the albumen *decreaſes* in proportion to the time of incubation; while that of the yolk *increaſes*; which ſeems to ſhew, that the one abſorbs the other: that the chick is enveloped in a peculiar membrane, which ſeparates it from the yolk, with which it has a connexion; and from the white, with which it has none, and from which it is at a conſiderable diſtance: that there exiſts a perfect analogy between the veſſels of the yolk, and thoſe of the placenta in

in quadrupeds; theſe veſſels being to the yolk what the placenta is to the matrix: that the albumen does not communicate with the inveſting membrane of the chick, and that, conſequently, contrary to the opinion of *Haller*, the chick makes no uſe of this fluid for its nouriſhment; but is nouriſhed by abſorption, by the umbilical chord; which, however, at the latter period of incubation is no longer viſible.

A foreign Phyſician, Dr. *Buvina*, has found, by experiments on living animals, that, in injections of freſh blood into the blood-veſſels, the blood penetrates only to thoſe in which red blood circulates during life; but having deprived the animal ſuddenly of life, by dividing the ſpinal marrow, the injections immediately penetrated to the moſt delicate veſſels of the perioſteum and other parts, giving them a red colour, which they have not in the living animal. He infers from hence, that in living animals the red blood is retained in its proper veſſels by the active vitality of the parts, rather than by the ſmallneſs of the veſſels and pores. The ecchymoſis which take place in ſcurvy and ſome other diſeaſes, probably depend on a weakneſs of the vital power in the extremities of veſſels, permitting the blood to penetrate into the capillaries.

The ſame gentleman has demonſtrated, by direct experiment, that a portion of bone of one animal, newly deprived of life, may be engrafted on that of another animal, of the ſame or a different ſpecies.

C. *Martin*, in a memoir read before the Medical Society of Paris, ſtrongly recommended the external application of *Acetic Æther* in Rheumatiſm, Sciatica, and Gout. M. *Sedillot*, many years ago, preſcribed it with ſucceſs, for the ſame purpoſe.—There ſeems no reaſon to ſuppoſe, that the *acetic* poſſeſſes any properties ſuperior to the *vitriolic*, or other æthers, in the caſes here mentioned.

Dr.

Dr. *Blackburn*, in the *Phil. Mag.* for the laſt month, furniſhes us with ſome peculiar ideas entertained by him, with regard to the nature of *caloric*, *light*, and *colours*, and which will form the ſubject of an intended publication.

Light he conſiders as a compound, reſulting from a peculiar combination of *caloric* and *oxygen*.

2. In all thoſe phenomena which have given occaſion to the idea, that *light* is identical with, or a modification of, caloric, the manifeſtation of the latter principle, he thinks, is to be referred to the diſunion of the conſtituting principles of light. The caloric, therefore, which ſo frequently reſults from the application of light to various ſubſtances, iſſues from the decompoſition of light in various degrees.

3. The phenomena of colours he aſcribes to the different qualities of light, as containing caloric and oxygen in different proportions. The different proportions manifeſt themſelves in the circumſtances both of the decompoſition, and the formation of variouſly-coloured light.

4. The ſeparation of light by the priſm, he regards as a chemical decompoſition; not as a phyſical or mechanical diviſion of light.

5. The changes which take place in the colours of different ſubſtances, as of plants in the proceſs of vegetation, and of metals in that of oxidation, are owing, he ſuppoſes, to correſpondent changes which theſe ſubſtances undergo in their chemical action upon light.

6. The evaneſcence, or, as it is frequently termed, the abſorption of light, is referred to the complete reſolution of this compound into its conſtituent parts.—

It is not poſſible to appreciate the truth or probability of theſe opinions, till we are furniſhed with the facts and experiments, which led to their adoption. The ideas of Dr. *Herſchell* on this ſubject, as lately laid before the Royal Society, are widely different.

He

He endeavours to prove, that *heat* is occaſioned by rays emanating from the ſun and candent ſubſtances, and acting on bodies on which they ſtrike; which rays are ſubject to the laws of reflection and refraction;—but we are not yet in poſſeſſion of the author's arguments, ſo as to be enabled to give our readers an adequate account of them.

Mr. *Carliſle* has lately made ſome intereſting experiments, which ſeem ſatisfactorily to prove the identity of the *electric* and *galvanic* fluids. He found, that a number of plates of ſilver, as forty or fifty (crowns or half-crowns) piled alternately with plates of zinc, having pieces of wetted paſteboard between each to complete the galvanic chain, will not only give an electric ſhock to the perſon who touches the top and bottom of the ſeries, but will continue to give an uninterrupted ſtream of the electric fluid; which being paſſed through water decompoſes it completely. If gold, ſilver, or platina wire, be employed to carry the electric matter into and from the water, both oxygen and hydrogen are liberated; but if oxydable metals are employed, hydrogen only is procured.

We mentioned in a curſory way, a ſhort time ago, the invention of flexible metallic bougies and catheters, by Mr. *Smyth*, Apothecary, of *Taviſtock Street.* Having ſince had an opportunity of examining them, and of witneſſing their application, we are enabled to ſpeak more decidedly of their merits. They appear to be equally flexible with the common plaiſter bougie, without the inconvenience of being readily broken, or yielding too much, from the heat of the parts to which they are applied. At the ſame time, they poſſeſs ſufficient firmneſs for any degree of force, which it can be proper to make uſe of, in overcoming an obſtruction mechanically; and they are readily ſuſceptible of a very high poliſh. When theſe properties are conſidered, together with their durability, as with moderate

moderate care they may laſt for many years, we have no doubt they will be conſidered as an important and valuable diſcovery.

C. *Zannetini*, a Phyſician who attended the French army in Italy, propoſes, as a ſubſtitute for the *cinchona*, the flowers and ſeeds of the common nettle (*urtica dicoides*, Lin.), in doſes not exceeding a drachm, given in wine two or three times in the ſpace of twenty-four hours. This is ſaid to be a more effectual remedy in intermittents, than the bark itſelf. It is heating in a great degree, and, when the doſe is pretty ſtrong, occaſions a lethargic ſleep.

It was for a long time ſuppoſed, that the aſtringent principle in oak and other barks, was that which effected the tanning proceſs in leather. Experiment, however, has demonſtrated the falſity of this notion. The bark of various trees contains the aſtringent principle, called *gallic acid;* and alſo another principle, which has a peculiar affinity to the matter conſtituting the ſkin of animals: this it is which is the *tanning* principle (*le Tannin*. Fr.). Theſe two principles are ſhewn, by Mr. *Biggin*, to be contained in very different proportions with regard to each other, in different ſpecies of bark, which thus become more or leſs fitted for the tanning proceſs. The *gallic* acid has no tendency to unite with ſkin; but precipitates iron from its ſolutions, of a black colour; thus forming inks of different degrees of intenſity.

The *tanning* principle precipitates a ſolution of common glue, which contains the matter of ſkin in a diſſolved ſtate: the precipitate thus thrown down, conſiſts of a chemical union of this with the tanning principle; and is, in fact, a powder of leather. The tanning principle diſſolves in water much more readily than the gallic acid, and may be obtained ſeparate, in a great meaſure, from this laſt, by *quick* infuſion, as of an hour. To obtain a ſtrong infuſion of the gallic acid

requires ſeveral, perhaps 48 hours (*Phil. Trans.* 1799, p. 2.).

A new inſtrument for the operation of trepanning the ſkull, has lately been propoſed, by Mr. *John Rodman*, Surgeon in Paiſley, and is deſcribed in the *Philoſophical Magazine* for April. The object of the Inventor is, to prevent the danger of the ſaw of the trephine or trepan paſſing ſuddenly in upon the brain, towards the end of the operation; and at the ſame time to accelerate the firſt ſtages of the operation. In order to effect theſe purpoſes, the ſhank of the ſaw is made to work in an upright frame ſupported on three legs, and furniſhed with a winch inſtead of a handle. A ſliding collar is made to fit on the ſhank of the inſtrument, and which, by means of a ſcrew, can be fixed at any part, thus preventing the ſaw from paſſing deeper than the Surgeon intends.—Of improvements of this kind in general it may be ſaid, that none of them can compenſate for the want of ſkill and caution in the practitioner; and where theſe are poſſeſſed, precautions of this ſort are unneceſſary.

A printed letter has been lately circulated by Mr. *Simmons*, of *Mancheſter*, addreſſed to Mr. *Ogden*, Surgeon, of *Aſhton-under-Line*, relative to the caſe of cæſarean operation lately performed in the Mancheſter Infirmary. The object of this letter is to invalidate ſome of the concluſions drawn by the authors of that caſe; and to ſhew that the woman's death was more fairly aſcribable to the operation itſelf, than to any previous injury ſhe had ſuſtained. The propriety of the after-treatment is, likewiſe, queſtioned. But although perſonal feelings may prolong the intereſt firſt excited by the ſubject, in the parties immediately concerned, this is not the caſe with the public at large. After the ample manner in which we have already noticed the matter, we may ſtand excuſed from dwelling longer

on

on it. Practitioners have probably made up their minds on the merits of the queſtion.

M. *Kauſer*, Surgeon at *Naugardt*, in Germany, recommends, for the cure of the tooth-ach, a ſtrong tincture of cantharides to be applied on lint to the gums of the affected tooth. A bliſter generally forms, and the pain, it is ſaid, ſoon ceaſes.

Dr. Joſef Celeſtino Mutis, the celebrated Spaniſh Phyſician and Botaniſt, who, in the Spaniſh dominions in South America, has been upwards of thirty years engaged in botanical reſearches, and eſpecially in inveſtigating the nature and medicinal virtues of the different ſpecies of Peruvian bark, ſtates, in a letter to a friend at Madrid, the reſults of his inquiries and experiments on this ſubject, in regard to the four principal ſpecies of bark, viz. the *orange-coloured*, the *red*, the *yellow*, and the *white*.

1. The *firſt*, the orange-coloured, is the only one, he obſerves, which is directly *anti-febrile*, the reſt being only indirectly ſo; 2. the *orange-coloured* is balſamic; the *red*, aſtringent; the *yellow*, bitter; and the *white*, ſaponaceous; and they all poſſeſs the peculiar quality aſſigned to them, in an eminent degree; 3. the *firſt* acts particularly upon the nervous ſyſtem; the *ſecond*, upon the muſcles; the *third*, upon the fluids; and the *fourth*, upon the inteſtines; 4. the *orange-coloured*, is accordingly the true ſpecific againſt intermittent fevers; the *red*, againſt mortifications; its antiſeptic virtue being alſo uſefully employed in clyſters, excepting, however, inflammatory diſeaſes, in which it is hurtful, as well as in bilious fevers; the *yellow* bark is ſaid to be a poweful remedy in continual, remittent, and putrid fevers; 5. the *white* bark is to be preferred to the three other ſpecies, in ſuch inflammatory fevers as indicate the uſe of bark; in chronical diſeaſes; in obſtinate intermit-

tents; and as a prophylactic; becauſe it is diſſolvent, prevents putrefaction, and purges gently (*Introd. to Quinologia of Dr. Ruix.*).

Dr. *Antonio Fernandez*, Surgeon to the Royal Family of Spain, and Fellow of the Royal College of Chemiſtry and Mineralogy at Madrid, has lately diſcovered an eaſy and expeditious way of ſo completely diſſolving camphire in common water, that, when the ſolution is finiſhed, the water, though perfectly ſaturated with camphire, is as clear as cryſtal. Of this camphorated water, uſed both internally and by injection, M. *Fernandez* ſays he has experienced the moſt ſalutary effects in the cure of chronical dyſuries and retention of urine; he has alſo employed it with much ſucceſs as a lithontriptic medicine. (*Madrid Gazette.*).

No. XXXVIII.

THE MEDICAL AND CHIRURGICAL REVIEW.

SEPTEMBER, 1800.

Art. XIII. Duncans' *Annals of Medicine for the Year* 1799.

(Continued from page 38.*)*

9. THE article next in order is,—'The Hiſtory of a Caſe of Tetanus, cured by the liberal Uſe of Wine: by Dr. *David Hoſack*, Phyſician, New York.'—There are many inſtances on record* of tetanus giving way to tonic and ſtimulant remedies; but ſucceſs in this way has by no means been general. The failure, on moſt occaſions, the author of the preſent hiſtory attributes to the complicated and inert manner in which remedies of this deſcription have been employed, convinced, as he is, that the proximate cauſe of locked-jaw conſiſts in an exhauſted ſtate of the ſenſorial power, from violent irritation applied to the nervous ſyſtem. Stimulants and tonics, there-

* *See* Medical Commentaries, vol. 3.—London Medical Obſervations, vol. 6.—American Philoſophical Tranſactions, vol. 2.—Memoirs of the Medical Society of London, vol. 3.

fore, appear to him beſt calculated to reſtore the loſt energy.

The diſeaſe, in the caſe here deſcribed, aroſe in a Mulatto woman, from the prick of a pin on the inſide of the wriſt. A large wine-glaſsful of Madeira wine was directed to be taken punctually every hour: the wound was pencilled freely with the lunar cauſtic, and ſuppuration ſolicited by the application of a poultice. After ſome hours, the ſymptoms were manifeſtly relieved, and a perfect cure was effected in a few days. The power of the remedy was more than once during the treatment evinced, in the increaſe of the ſymptoms upon diſcontinuing or diminiſhing its uſe.

10. 'Sequel of the Caſe of an Extra-uterine Fœtus, partly voided through an Abſceſs in the Abdomen: by Mr. John Major Wilſon, Surgeon to the Weſtminſter Hoſpital.'—The former part of this caſe was publiſhed in the *Annals of Medicine for* 1797.* The patient lived many months after the firſt burſting of the abſceſs, but at length ſunk under the continued diſcharge. On diſſection, a cavity was found containing the remaining bones of the fœtus, and which appeared to have been the fallopian tube of the left ſide. A communication was obſerved to have taken place with the colon, in conſequence of ulceration, and one of the bones had partly made its way into the inteſtinal canal.

11. 'Account of a ſingular Caſe of Obſtruction to the Excretion of Urine: by Mr. *D. M. Dickſon*, Surgeon in the Navy.'—This caſe originated in phymoſis, the reſult of venereal infection. There was much inflammation and ſwelling of the prepuce, with accretion of its external edges to each other, totally obſtructing the diſcharge of urine, when attempted in the uſual way, the fluid being allowed to paſs no

* Vide Medical and Chirurgical Review, vol. 5, page 105.

farther

farther than between the prepuce and glans; from which it regurgitated into the bladder, as ſoon as the preſſure of the diaphragm and abdominal muſcles was removed. To free himſelf from the pain neceſſarily ariſing from this circumſtance, the patient had been in the cuſtom of breaking a paſſage through the ſkin, with a piece of pointed wood, or other ſimilar inſtrument; but as the aperture cloſed immediately afterwards, he had the ſame operation to perform every time he made water, which he did as ſeldom as poſſible, to avoid the dreadful pain attending it. On laying open the prepuce, which was enormouſly enlarged, there appeared a numerous collection of round and oval calculi, with a quantity of ſand impacted on each ſide of the frœnum; and the internal ſurface of the prepuce had the exact reſemblance of a fowl's gizzard inverted. A cure ſoon ſucceeded to the operation.

12. 'Obſervations on the Benefit derived from the Application of cold Water, in Caſes of *Scarlatina Cynanchica*: by Dr. *G. Moſſman*, Phyſician at Bradford.'—Our readers will recollect the advantages derived from the application of cold water by Dr. Currie, in the treatment of fevers of different ſpecies. In the caſes here narrated, the good effects of this remedy were equally manifeſt. The author's mode of application, however, is different from that employed by Dr. Currie, as he has conſtantly recommended cold vinegar, or vinegar and water, to be applied to the whole ſurface of the body, by means of a ſponge. —We think it may be queſtioned whether the mode of action be the ſame in thoſe two ways of applying cold to the ſyſtem. Dr. Currie attributes much to the ſuddenneſs and intenſity of the application.

13. 'The Hiſtory of a Caſe in which a ſevere Wound of the Tongue, threatening Locked-jaw, terminated ſucceſsfully: by Dr. *G. D. Yeats*, of Bedford.' —The tongue in this caſe was lacerated to the extent of half an inch, in conſequence of a fall. Union of

the divided parts took place ſpontaneouſly.—There ſeems no ground for the author's great apprehenſion of tetanus or locked-jaw ſucceeding in this caſe; nor for his avoiding ſuture on that account. The vicinity of the injured part to the muſcles of the jaw, is ſurely no reaſon for their becoming ſpaſmodically affected. Bark and opium, however, were exhibited, together with the uſe of wine, as if locked-jaw were actually about to follow.

14. 'Medical Hiſtories: by Dr. *John Haxby*, Phyſician, at Pontefract.'—The firſt caſe here related is one of epilepſy, terminating favourably under the uſe of muſk and opium. The diſeaſe occurred in a girl of nine years of age, and had ſubſiſted for two years, notwithſtanding the uſe of various remedies, and, amongſt the reſt, the nitrate of ſilver, the cold bath, anthelmintics, &c. The number of paroxyſms in twenty-four hours amounted to twenty, or more, and ſhe always experienced them on lying down in bed; the regularity of this was not in the leaſt affected by any change in the time of retiring to reſt, by any difference of temperature, variety of rooms or beds, admiſſion or excluſion of light, ſolitude, or ſociety. For the laſt ſix months ſhe had ſimilar paroxyſms in her ſleep to thoſe ſhe had in the day time. The alvine and veſical excretions had for ſome months come away involuntarily. Muſk and opium were given previous to the expected fit; the former in doſes of fifteen grains, the latter in thoſe of one grain, by degrees increaſing the quantities. The good effects of this treatment were ſoon apparent, by the gradual diminution of the number of fits, which, in leſs than three weeks, ceaſed altogether.

In the ſecond caſe, the teſticles had not deſcended into the ſcrotum till the patient had attained his fourth year, and, by their detention in the groin, had occaſioned conſiderable pain and fever. Theſe ſymptoms diſappeared as ſoon as the teſticles had paſſed the ring,

ring, and defcended into the fcrotum; an effect which took place fpontaneoufly.

The remaining cafe was an enlargement of the fpinal vertebræ in a boy, attended with paralyfis of the lower extremities, and which was treated by cauftics, though without any confiderable relief. The trochanter major of the right thigh-bone began now to be enlarged; and in proportion as it increafed in bulk, the difeafed fpinal vertebra was diminifhed, till at laft there was no inequality in the appearance of the fpine. After the fwelling of the thigh-bone had continued for the fpace of a month, this alfo began to decline, but was followed by the fymptoms of hydrocephalus, which foon terminated in death.

15. 'Hiftory of a Cafe of retropulfed Gonorrhœa, fucceeded by a fevere Affection of the Eyes, terminating favourably: by Dr. *Robert Robertfon*, Army Surgeon.'—It feems not improbable that the ophthalmia in this cafe arofe from the local application of the urethral matter to the eye itfelf.

16. 'Examples of the good Effects of the *Hydrargyrus Muriatus Mitis*, in Cafes of the Cynanche Trachealis, or Croup: by Mr. James Anderfon, fen. Surgeon in Edinburgh.'—Four cafes of croup are here related, which got well under the ufe of calomel; and others are alluded to in which this remedy feemed to the author to be effectual. The calomel was given in dofes of three and four grains twice a day, without inducing falivation, or even much purging. The relief experienced, in moft of the cafes, fo fpeedily fucceeded the exhibition of the remedy, viz. within four-and-twenty hours, that we think it doubtful how far it can be fairly attributed to the calomel. Croup is often a mild difeafe, and terminates independently of the ufe of any remedies.

17. 'The Hiftory of three Cafes, with Circumftances fomewhat fingular, terminating favourably: by Dr. George Borthwick, of Kilkenny.'—The firft of thefe is a cafe of wounded kidney, from the thruft of

 a fword

a ſword under the ſhort rib of the left ſide. The injury to the kidney was manifeſted by a diſcharge of blood through the urethra, returning at intervals for three weeks or a month. This was followed by a purulent ſediment in the urine, continuing for eight days. The patient, it appears, was alone benefited by repeated blood-letting. The other caſes are, one of bubonocele in a woman, for which the operation was ſucceſsfully performed; and one of cataract, where the cryſtalline lens was extracted. Neither of them preſents any thing uncommon.

The third ſection, devoted to *Medical News*, commences with a Letter from Dr. *Guthrie*, of Peterſburgh, containing a variety of intereſting matters, from which we extract the following. After reciting a caſe of ophthalmia, which was cured by the application of ſpirits of turpentine to the eyelids, and which we formerly noticed,* he remarks,—' Another caſe which occurs to my memory as worthy of medical record, from the uncommon violence of the diſeaſe, and the uncommon quantity of zinc given to ſubdue it, is one of epilepſy, by much the moſt alarming I ever met with, in thirty years practice. The paroxyſms returned four times in twenty-four hours, with wonderful violence; whilſt each fit was accompanied by a moſt diſtreſſing tetanus, that drew the patient's head backwards in a frightful manner, and rendered it impoſſible to keep him in bed, without uſing ſuch violence as threatened the diſlocation of ſome member; ſo that we were obliged to let him roll about on the floor of a room ſpread with mattreſſes.

' The young ſufferer was a gymnaſyſt of the imperial corps of noble cadets, aged ſixteen, who was carried into the lazaret, or hoſpital of the eſtabliſhment, in the deplorable ſtate mentioned above; brought on, as we were informed, by a fright ſometime before:

* *See* page 510 of our laſt volume.

but

but his mother, a poor widow, had concealed his being ſubject to the diſeaſe, leſt he ſhould have been refuſed admittance into the corps.

'As the caſe was highly alarming, Nature being unable to ſuſtain long ſo violent a conflict with ſcarce any intermiſſion, I formed the reſolution of giving the flowers of zinc with empiric boldneſs; and, after ordering ten ounces of blood to be taken from the arm, as the youth was plethoric, I gave him eight grains of *flor. zinc* the firſt day, with conſerve of roſes, and augmented the doſe by four grains every fourth day, till the thirty-ſecond from the attack; when it amounted to two ſcruples, or forty grains, which he took for a month conſecutively, till every veſtige of the diſeaſe was gone.

'No other medicine was found neceſſary during the whole cure, as the zinc kept his body ſufficiently open; and it was highly intereſting to obſerve, that, in proportion as the doſe of the ſedative mineral was augmented, the diſeaſe gradually diminiſhed in frequency and violence; firſt, to three fits a day; then to two; next, to one; till, on the thirty-ſecond, the doſe of two ſcruples completely overcame the ſpaſms, and the diſeaſe finally vaniſhed, never, I hope, to return, as he has now been two years without a ſingle fit.

'The diſtreſſing tetanus diminiſhed likewiſe in violence with the paroxyſms of epilepſy, though it never left our young patient till the whole ceaſed together at the epoch mentioned above, although I thought it prudent to continue the large doſe of two ſcruples for a whole month, to enſure the permanence of the cure, as no diſagreeable conſequences ever attended the exhibition of the zinc, except a little trifling nauſea towards the beginning, which went off without giving us any trouble. I muſt not forget to remark, that the doſe was always divided into two equal parts; one to be taken in the evening, the other in the morning.'

Dr. G. next mentions the caſe of a cabinet-maker, who, whenever he attempted to work at his bench, was ſeized with a violent palpitation of the heart, which ſoon brought on an inflation of the ſtomach and lower belly, attended with ſickneſs. He had ſwelling of the legs, and a ſenſe of ſuffocation on lying down. After trying, fruitleſsly, various remedies, his complaint was removed by ſwallowing daily a table-ſpoonful of *common ſand*, previouſly waſhed and dried. It purged him pretty briſkly.

The good Effects of Cold in Madneſs are next pointed out, by Dr. *G. G. Brown*, of Bath.—'Within the period of theſe laſt ten years,' he obſerves, 'I have met with five caſes in the courſe of practice. The two firſt caſes were abandoned by two very eminent phyſicians, who have already done ample honour to their profeſſion, and for whom I entertain the higheſt regard.

'Two more caſes were attended by me alone; and two moſt reſpectable phyſicians were witneſs to the ſubſequent mode of treatment in the fifth caſe. After a failure of the moſt approved medicines and practice, the application of cold water to the head, aſſiduouſly perſevered in for many days, performed the cure.

'I well know that this is an old ſpecies of practice, and, alſo, that it has often proved unſucceſsful: this, however, I attribute in a great meaſure to the manner of uſing it. The method I purſued in the firſt four caſes was, by winding an handkerchief round the head, and keeping it continually wet with a ſpunge dipped in cold water, until it produced a ſhivering fit: it was then deſiſted from, for about an hour, more or leſs, and re-applied as before.

'After the firſt twenty-four hours there was no inconvenience felt in having it always kept round the head. Between thirty and fifty hours from the commencement of the application, ſobbing and ſighing came on, which have hitherto proved the criterion of the

the incipient return of rational ideas. This being effected, the vitriolic acid alone, or combined with the cinchona, in conjunction with the cold application, have uniformly perfected the cure. In the firft and fifth cafe the application was not confined to the head, but extended along the courfe of the carotid and fubclavian arteries. From feven to fifteen days, where the delirium has been of confiderable ftanding, have been the extent of this mode of practice; although I fhould not have hefitated continuing it a much longer time, had it been found neceffary.'

Dr. *Yeats*, of Bedford, makes fome Remarks on the Effect of Nitric Vapour in deftroying Contagion.—Refpecting the objections which Dr. *Trotter* has made to Dr. *Smyth*'s plan, he obferves, that Dr. T. fays—"Dr. Smyth's preventive is the very fubftance that every intelligent officer is hourly employed to drive from the decks of his Majefty's fhips."—And again,—" In Dr. Smyth's procefs, when the nitrous acid is converted into gas, it lofes a portion of pure air; it is now an elaftic fluid, under the title of nitrous air, or gas. In this ftate it will remain for fome time, till it again, by a chemical attraction, recover its pure air, when, by its fpecific gravity, it will fall to the deck,—nitrous acid."—Were this ftatement correct, the inference no one could deny; but it is not *nitrous gas* which is difengaged, but concentrated *nitric acid* in a *ftate of vapour*. In this ftate it has a large quantity of oxygen in its compofition: inftead, therefore, of abltracting that principle, it will readily part with it, and thus render the atmofphere purer. The fumes procured from nitre by the fulphuric acid, are very different in their appearance and qualities from nitrous gas. The former is a white vifible vapour, but nitrous gas is invifible; and when fet free, immediately unites with the oxygen of the atmofphere, and forms the orange-coloured nitrous vapour: there is, therefore, a material difference between the two. This miftake feems

to

to have efcaped the notice of all who have engaged in this controverfy between Dr. Smyth and Dr. Trotter. There is no doubt that the *nitrous gas* would be extremely prejudicial; but the *nitric vapour* is certainly ufeful, and poffeffes qualities diametrically oppofite to the nitrous gas. Dr. Trotter's objections to Dr. Smyth's plan, appear to have arifen from his not having a perfectly diftinct chemical idea of the nature of thefe gafes. Dr. Trotter obferves (p. 299.),—" That in proportion to the quantity azot attracts of oxygen, it is called azot, azotic gas, nitrous gas, nitrous acid, nitric acid."—Again (p. 239.),—" There is no great difference between azotic and nitrous gas."—The miftake here is evident; azot and azotic gas contain no oxygen. This principle is termed fimply azot, when freed from its caloric; but when it affumes the aeriform ftate by a combination with the matter of heat, it is called azotic gas. With refpect to the difference between azotic and nitrous gas, there is a very material one. The azotic gas contains no oxygen, and does not readily unite with it, as every one knows who has attempted to form the nitrous acid, by paffing the electric fpark through a mixture of azotic and oxygen gafes. Nitrous gas, on the contrary, is a compound containing oxygen, and readily uniting with it, to form nitrous acid at the temperature of the atmofphere.'

The remainder of the volume, exclufive of fome biographical fketches, either relates to fubjects that are not new to our readers, or is not of fufficient importance to detain us longer.

ART.

Art. XIV. *Tranſactions of a Society for the Improvement of Medical and Chirurgical Knowledge.* Vol. II.

(*Continued from page 86.*)

5. THE article next in order is entitled,—'An Account of a Caſe of Diabetes, with an Examination of the Appearances after Death: by *Matthew Baillie*, M.D.' &c.—The attention of the faculty has been of late ſtrongly directed to the ſubject of diabetes, in conſequence of the ingenious ſpeculations which have been entertained with regard to it by Dr. Rollo, and with which our readers have been made fully acquainted. We ſaw him labouring to eſtabliſh a theory of this diſorder, in many reſpects new and original, and leading to a mode of treatment ſucceſsful beyond every one hitherto in uſe. But, though we gave full credit to the general accuracy and diſcernment of Dr. Rollo, and could not fail to acknowledge the decided influence of the treatment ſuggeſted by him in reſtraining the exceſſive urinary flow, we heſitated to admit his notions reſpecting the ſeat and immediate cauſe of diabetes, and felt inclined, with many of the moſt diſcerning practitioners, to refer its origin rather to renal affection, than to defective or morbid aſſimilation, as the primary cauſe. In the paper before us we find Dr. Baillie inclining to a ſimilar opinion, though with that degree of doubt and heſitation which every cautious inquirer muſt feel in the inveſtigation of a queſtion involved in ſuch great obſcurity.

The general ſymptoms of the caſe here deſcribed correſpond pretty exactly with other hiſtories of the diſeaſe. We may remark, however, that the patient had not been given to intemperance, and had previouſly enjoyed good general health. He had a ſevere purging, which continued between three and

four

four weeks; but this ſeemed to produce no change whatever on the diabetes. After a trial of a conſiderable variety of medicines, without any viſible advantage, he was ſeized with a ſore throat, and violent eryſipelas of the face, which carried him off in a few days.

The only part of the diſſection that is of importance to be noticed, regards the ſtate of the kidneys, the ſtomach, and the inteſtines.—'Both kidneys,' Dr. Baillie obſerves, 'were of the ordinary ſize and ſhape. When the proper capſule was removed from each, the veins upon the ſurface were much fuller of blood than uſual, putting on an arboreſcent appearance. When the ſubſtance of both kidneys was cut into, it was obſerved to be every where much more crowded with blood-veſſels than in a natural ſtate, ſo as in ſome parts to approach to the appearance of inflammation. Both kidneys had the ſame degree of firmneſs to the touch as when healthy; but I think were hardly ſo firm as kidneys uſually are, the veſſels of which are ſo much filled with blood. It is difficult, however, to ſpeak very accurately about nice differences in degrees of ſenſation, unleſs they can be brought into immediate compariſon.

'A very ſmall quantity of a whitiſh fluid, a good deal reſembling pus, was ſqueezed out from one or two infundibula in both kidneys, but there was no appearance of ulceration in either. Upon firſt taſting the fluid, I thought it had ſome degree of ſweetneſs, but upon a repetition I was doubtful.

'The artery and vein paſſing into the cavity of each kidney, preſented exactly the natural appearance.—After ſeparating a good deal the cellular membrane which joins together the blood-veſſels, I diſcovered a lymphatic paſſing from one of the kidneys: this was of the uſual ſize, had the common valvular appearance, and was empty. There were, doubtleſs, ſeveral others belonging to both kidneys, but theſe were ſo ſmall as

not

not to be diſtinguiſhable; a circumſtance which is very common in the lymphatics of the kidneys.

'The nerves of the kidneys were of the uſual ſize, and the ureters of both were perfectly natural.—The renal capſules appeared quite healthy.

'There was alſo no diſeaſed appearance in the urinary bladder: its inner membrane was more crowded than uſual with ſmall blood-veſſels, but this is not uncommon in all ſtates of the body. I could perceive no lymphatic veſſels at the neck of the bladder; but theſe are generally of ſo minute a ſize as to be diſcoverable with great difficulty.

'*Stomach and Inteſtines.*—In cutting into the ſtomach, ſome quantity of a green pulpy matter was found, and there was alſo the ſame kind of matter in the duodenum. The matter in the upper part of the jejunum was of the ſame ſort, but much more fluid. The ſtructure of the ſtomach was quite ſound. In ſome parts of its inner membrane there were little red ſpots, produced by an accumulation of very fine blood-veſſels; but this appearance is extremely common in other caſes. There was a greater determination of blood than uſual to the whole track of the ſmall inteſtines, but their ſtructure was every where ſound. The great inteſtines had no particular determination of blood to them, but were diſtended with air.

'The meſenteric glands were all healthy, except one or two, which contained a good deal of an earthy matter: no lacteal veſſels were any where viſible.'

This account of the appearances on diſſection is followed by a ſhort view of the principal theories which have been formed about the cauſe of this diſeaſe, and an inquiry how far thoſe appearances tend to ſupport or invalidate them. The importance of the ſubject induces us to be particular in our account of it.—'It was the opinion of Dr. Mead,' the author obſerves, 'and his authority made it at one time pretty generally received, that diabetes depended on a morbid ſtate of the liver and bile. He was led to this idea from

from having found, in the livers of perfons who had been afflicted with diabetes, what he has called fteatomatous collections. That the liver may be difeafed where there is diabetes, will readily be granted; but that a difeafed ftate of the liver is neceffary, in order to produce diabetes, is certainly without foundation. The liver, in the cafe which we have related, was perfectly found, and the bile had no uncommon appearance. In other cafes of diabetes, the liver has generally been found, upon examination, to be in a healthy ftate. In thofe cafes of diabetes, therefore, where the liver has been difcovered to have been difeafed, it fhould be confidered as an accidental concurrence, and not that there had been any neceffary connexion between the one difeafe and the other.'

'It was the opinion of the late celebrated Dr. Cullen, and the fame idea was afterwards profecuted with more minutenefs by Dr. Dobfon,* that diabetes depended on the chyle not being affimilated into the nature of blood, but that, circulating in the blood-veffels as chyle, it was ftrained off by the kidneys in the form of fweet urine. It is evident that this opinion is founded upon the fuppofition that chyle contains fo large a proportion of faccharine matter as to be capable of communicating a fweet tafte to the urine when mixed with it. In two dogs which were killed on purpofe for making this experiment, I tafted the chyle. In the chyle of the one I was not fenfible of any fweetifh tafte: the chyle of the other feemed to me to be fweetifh, but this tafte was fo very flight, that, when a part of the chyle was mixed with an equal proportion of water, the mixture was perfectly infipid; it would, therefore, have been ftill lefs capable of communicating a fweet tafte to the fame proportion of the urine.† The chyle in man cannot be fuppofed

'* *See* Medical Obfervations, vol. 5.

'† Thefe two dogs were fed upon animal food. About the time of this volume of the Medical and Chirurgical Tranfactions being fent to the

ſuppoſed to differ from that in a dog, as digeſtion is precifely the ſame kind of proceſs in both ſpecies of animals: it is therefore evident, that the ſweetneſs of the urine in diabetic patients cannot ariſe from a mixture of chyle not aſſimilated into the nature of blood, and being ſtrained off by the kidneys along with the urine.

'Dr. Dobſon has mentioned, as a proof of the truth of his opinion, that the ſerum of the blood, taken from the arm of a diabetic perſon, had ſome degree of ſweetneſs to the taſte. The ſerum of the blood, however, taken from other diabetic patients, has not only been found not to be ſweet, but even to have the ſaltiſh taſte of common ſerum; and whatever may have produced the ſweet taſte of the ſerum in the caſe related by Dr. Dobſon, it is obvious that it could not ariſe from the mere mixture of unaſſimilated chyle.

'It appears, farther, to be a ſtrong argument againſt the truth of the opinion entertained by Dr. Dobſon, that, in caſes where the urine in diabetes has been found to be very ſweet, the ſerum has retained its uſual ſaltiſh taſte. If the ſweetneſs of the urine really aroſe from the mixture of unaſſimilated chyle ſtrained off along with the ſuperfluous water of the blood by the kidneys, one would naturally be led to believe, that, in caſes where the urine was very ſweet, a ſweetiſh taſte ſhould alſo be perceptible in the ſerum, from which, according to this theory, it may be ſaid to be derived. In very ſlight caſes it might be allowed, that a ſweetiſh taſte may be perceptible in the urine, and not in the ſerum, on account of its greater

the preſs, I taſted the chyle of a dog which had been fed upon bread, with butter very thinly ſpread upon it. The chyle ſeemed to me to be a little ſweeter than in one of the former experiments, where the dog was fed upon meat; but if this chyle had been mixed with an equal proportion of ſerum, or of urine, it would not have imparted the ſlighteſt degree of ſweet taſte to them. The force of the preſent argument, therefore, I do not conſider as being in the leaſt affected by this laſt experiment.'

maſs;

maſs; but, in all ſtrong caſes, this ſuppoſition cannot, I think, be conceded.

'It has been ſuppoſed, by a late very ingenious author,* that diabetes is produced in conſequence of chyle paſſing by a retrograde motion of the abſorbent veſſels from the lacteals into the lymphatics of the kidneys or the bladder. This opinion proceeds, like the former, upon the idea that chyle contains ſo much ſaccharine matter as to be capable of communicating a ſweet taſte to the urine, when mixed with it, which we have already ſhewn to be ill founded. If it be ſaid that the chyle in diabetic patients is much ſweeter than that of perſons in health, it ſeems to me that there can be no ſatisfactory evidence of the truth of this opinion, except what ariſes from an examination of the chyle itſelf. Beſides, no deciſive proof has been given of the retrograde action of the abſorbent veſſels, and this idea is ſo contrary to the contrivances in their ſtructure, and their obvious mode of action, that it ſhould not be admitted but upon the moſt unequivocal evidence.

'The œſophagus, the ſtomach, and the inteſtinal canal, which are capable of an antiperiſtaltic motion, have been brought into compariſon with the abſorbent veſſels, as being ſimilar to them in ſtructure, and an argument in favour of the retrograde action of the abſorbents has been founded upon this analogy.—Theſe parts bear, however, but a very remote analogy to each other, either in ſtructure or in uſe, and therefore an argument built upon this analogy would ſeem to be inconcluſive. The veins bear a cloſer analogy to the abſorbents in their ſtructure, and there are no diſeaſes, as far as I know, which demonſtrate in the veins a retrograde mode of action.

'It may be conſidered as a ſtrong argument againſt a retrograde action of the abſorbents, when applied to explain the phenomena of diabetes, that no anaſto-

' * *See* Darwin's Zoonomia, from p. 311 to p. 322.'

moſis

moſis has been demonſtrated in the human body between the lacteal veſſels and the lymphatics of the kidneys or bladder, and that it is not likely ſuch an anaſtomoſis between them commonly takes place. What varieties may exiſt in particular individuals it is impoſſible to ſay, but there is ſufficient ground for believing that ſuch an anaſtomoſis makes no part of the general ſtructure. The route of the blood-veſſels and lymphatics is very much the ſame in moſt of the internal parts of the body, and no anaſtomoſis takes place between the blood-veſſels of the kidneys or bladder, and the blood-veſſels of the ſmall inteſtines. From analogy, therefore, we ſhould be led to believe, that there was no anaſtomoſis between the lacteals and the lymphatics of theſe parts.

'If this anaſtomoſis really took place, and the opinion about the route of the chyle above ſtated was well founded, one would expect the anaſtomoſis to be particularly obſervable in a perſon who had been long affected with diabetes: the lacteals and the lymphatics of the urinary organs would probably be more conſpicuous than in common caſes, and, therefore, their junctions with each other be more readily detected. In the caſe of the diabetic patient, of which we have given an account, the lacteals were ſo ſmall as not to be viſible; one lymphatic could only be diſcovered belonging to one of the kidneys, and the lymphatics at the neck of the bladder were not to be obſerved.

'Neither is there any reaſon to believe that there muſt be a communication between the lacteals and the lymphatics of the bladder or kidneys, accompanied with a retrograde action of their coats, becauſe urine is ſo ſoon voided after a conſiderable quantity of any aqueous fluid has been drank. The abſorbent veſſels of the ſtomach and inteſtines can convey their contents at a very quick rate to the thoracic duct. I recollect to have ſeen ſome lacteal veſſels empty themſelves almoſt inſtantaneouſly, when looking up the meſentery of a dog which had been killed a few hours after tak-

ing food; and ſome experiments, made lately upon the ſtomachs of living animals, ſhew, that watery fluids can be taken up by the abſorbents of the ſtomach in a very ſhort time, and carried into the thoracic duct.*

'Were the rate of abſorption from the ſtomach and the inteſtines even much leſs than it is known to be, I ſhould be more apt to believe that the quick evacuation of urine, after a perſon has drank a conſiderable quantity of aqueous fluids, was owing to a ſympathy between this ſtate of the ſtomach and the kidneys, than to a retrograde action of the abſorbent veſſels. There is a general communication of ſtrength to the ſyſtem when the ſtomach has received plenty of food after much faſting, long before the food can have been converted into chyle, and carried into the general circulation. This muſt depend upon a ſympathy between the ſtomach when it has recently received food, and the general ſyſtem. In the ſame manner we may ſuppoſe, that, when a conſiderable quantity of aqueous fluids has been drank, the kidneys ſympathize with this ſtate of the ſtomach, and are excited to a more vigorous ſecretion. There appears to me, however, to be no need for this ſuppoſition, as the rate of abſorption is ſo great, that water may get from the ſtomach into the circulation in a few minutes.†

'It

'* Theſe experiments were made upon a goat and a dog, by Mr. Carliſle, one of the ſurgeons of the Weſtminſter Hoſpital. Above a pint of water was taken up from the ſtomach in leſs than twenty minutes, and the abſorbents at the ſmall curvature of the ſtomach were obſerved to be turgid with a tranſparent fluid like water, and were paſſing in the direction of the diaphragm towards the thoracic duct.'

'† I cannot avoid thinking, that the quick evacuation of urine, after watery fluids have been drank, has been in ſome degree miſunderſtood. It is a certain time, not very inconſiderable, after the firſt quantity of aqueous fluids has been drank, before urine is made; but more aqueous fluid being drank with frequent repetition, the blood ſoon receives a ſuperabundant quantity of water, and this is thrown out by the urinary paſſages at very ſhort intervals. What has been laſt drank is not to be ſuppoſed to be evacuated, but a certain quantity of water is ſeparated by the kidneys from the general ſtore of water which had been accumulated in the blood-veſſels. Although, therefore, the evacuation of water by the urinary paſſages happen ſoon after a quantity

'It has been ſuppoſed by others, that diabetes depends on the tubuli uriniferi of the kidneys being relaxed or enlarged, and that the chyle eſcapes with the urine, giving it the particular properties of the urine in this diſeaſe.

'The mixture of chyle with the urine, unleſs much ſweeter than common chyle, would not (as we have oftener than once obſerved) form the ſweet urine of diabetes; and, therefore, this morbid change muſt depend on ſome other cauſe than the mere mixture of the chyle with the urine.

'Tubuli uriniferi, ſo enlarged as readily to allow the chyle to paſs, could hardly fail of admitting, likewiſe, the red globules of the blood. The urine in diabetes, however, ſhews no mixture of the red globules, but is of a colour ſomewhat like whey.

'The mammillary ſubſtances of both the kidneys, in the caſe which we have deſcribed, had the natural firmneſs; and the tubuli (which in moſt kidneys are ſufficiently viſible) did not appear in the ſmalleſt degree enlarged.'

6. 'An Account of two Caſes, ſhewing the Exiſtence of the Small-pox and the Meaſles at the ſame time; and an Account of a Caſe of Ague in a Child in Utero: by Dr. *P. Ruſſel.*'—The meaſles and the ſmall-pox were epidemical at the ſame time at Aleppo, in the year 1765. The moſt ſtriking circumſtances of their hiſtory are here given. Many children ſuffered both diſeaſes in ſucceſſion, as uſual. The meaſles were rarely obſerved to ſucceed the ſmall-pox in leſs than twenty days, reckoning from the eruption. The

tity of aqueous fluid has been drank, yet it does not take place in ſo ſhort a time as has commonly been imagined.

'I cannot explain the experiment mentioned by Dr. Darwin, in which, after nitre had been taken into the ſtomach, it was diſcoverable in the urine, but not in the ſerum of the blood. I am perſuaded, however, it will hereafter be explained, without having recourſe to the ſuppoſition of there being a communication between the abſorbents of the ſtomach, and thoſe of the urinary organs.'

ſmall-pox commonly ſucceeded the meaſles ſomewhat earlier in the third week; but ſeveral caſes were met with in which the puſtules of the ſmall-pox were diſcovered on the face, before the total diſappearance of the meaſles on the limbs; that is, on the eleventh or twelfth day. The reciprocal influence of the two diſeaſes in the ſame ſubject was carefully attended to in above three hundred caſes; and ſo little did the quality of the firſt diſeaſe ſeem to influence that of the ſecond, that a mild, diſtinct ſmall-pox was often obſerved to follow the worſt kind of meaſles, and vice verſa.

The extraordinary inſtance of the two diſeaſes exiſting together in the ſame ſubject, occurred in the caſe of a female child, two years old. The redneſs of the eyes, the coryza, and the cough which accompanied the fever, led the author to expect the meaſles. On the fourth day, the eruptions of the meaſles were viſible on the face, the neck, and the back; but at the ſame time a few eruptions of a different kind were interſperſed on the face and neck, which, if they had been the ſole eruption, the author would, without heſitation, have declared to be the ſmall-pox. The progreſs of the puſtules on the fifth proved them to be variolous. Both eruptions were of a favourable kind, and diſtinctly purſued their regular courſe. On the eighth day the meaſles were fading faſt, while the variolous puſtules on the face were near their height. The puſtules were not numerous, were very diſtinct, and ripened perfectly. The cough continued to be a troubleſome ſymptom, eſpecially in the ſecond week. Another caſe of a ſimilar nature is recited, and which occurred about the ſame period.—Theſe are the only caſes, as far as we know, which can be relied on, of ſmall-pox and meaſles occurring together, a coincidence which the late Mr. Hunter doubted the poſſibility of: they have frequently ſeemed to ſuperſede each other, when the ſyſtem has been expoſed to both infections at one time.

Dr.

Dr. Ruſſel inferred the exiſtence of ague in the child in utero from its being felt to tremble with great violence, accompanied with a ſenſation of ſudden weight and coldneſs in the womb. The coldneſs went off in leſs than fifteen minutes, and was ſucceeded for more than an hour by a glowing heat. The mother laboured under a tertian fever at the time, which returned regularly at noon; and it is remarkable that the fœtus ſeemed to ſuffer a paroxyſm perceptibly diſtinct from that of the mother, the ſymptoms above-mentioned occurring about eight in the morning of the odd days. On the acceſs of the fever at noon the child became reſtleſs, but in a way totally different from the trembling in the mornings. The ſame circumſtances invariably attended every fit, till the eleventh day of the diſeaſe, when they were put a ſtop to by the Peruvian bark; in the child a day ſooner than in the mother.

7. 'Caſes and Obſervations on Strangulated Hernia: by *Everard Home*, Eſq.'—The caſes here brought forward are calculated to afford inſtruction on a very important branch of ſurgery. We learn from them, as the author obſerves, that the ſymptoms correſpond with the ſtate of the inteſtine. When the ſtricture is only ſufficient to compreſs the inteſtine, and to prevent the contents from paſſing through the ſtrangulated part, there is vomiting, hickup, thirſt, and general uneaſineſs, which ſymptoms come on ſome hours after the protruſion of the gut, and are very ſlow in their increaſe. When the ſtricture is in ſo great a degree as to produce inflammation on the compreſſed part of the gut, the ſymptoms come on immediately; the vomiting does not ceaſe upon the ſtomach diſcharging its contents, but the retchings continue: there is a conſiderable tenderneſs over the whole belly; the pulſe is quick, and very ſmall, and the ſpirits of the patient are much depreſſed. Theſe ſymptoms are more or leſs violent, and their progreſs is more or leſs rapid, in proportion to the degree of the inflamma-

 tion.

tion. If it only produces adhefions, the pulfe is lefs contracted, there is lefs tendernefs over the abdomen, and lefs depreffion of fpirits. When the ftricture is fo tight as to obftruct the circulation of the blood in the part, all thefe fymptoms are met with in the greateft degree of violence; an unufual coldnefs is felt over the furface of the body, and mortification takes place in the ftrangulated portion of the inteftine.—In proportion to the violence of the fymptoms above-enumerated, is the expediency of performing the operation at an early period.

8. ‘ A fatal Cafe of Hernia of fome of the Abdominal Vifcera ftrangulated in the Cavity of the Thorax: by *John Clark*, M.D.’—The protrufion in this inftance took place through a preternatural perforation in the diaphragm, on the left fide, a cafe not altogether fingular.

9. ‘ On the Effect of the pure fixt Alkalies, and of Lime-water, in feveral Complaints: by *G. Blane*, M D.’—The utility of remedies of this defcription in diforders of the urinary paffages has been long known, and the theory of their operation here given is not new. Dr. Blane next mentions the good effects of alkalies and lime in certain cafes of indigeftion, efpecially thofe in which acidity is the prevailing fymptom. He has obferved, he thinks, a manifeft fuperiority of the mineral over the vegetable alkali, in ftomach complaints. He fuppofes that thefe remedies do not fo much act by deftroying acidity in the contents of the ftomach, as on the *gaftric acid*, which may be fecreted in fo concentrated a ftate, or in fuch quantity, as to conftitute difeafe. The prefence of fuch an acid is evinced, Dr. Blane obferves, by applying the ufual tefts to the inner furface of the ftomach.

There is another clafs of diforders in which the good effects of lime-water and pure alkalies have not, the author conceives, been fufficiently attended to. Thefe are

are certain cutaneous complaints, particularly thoſe affecting the face, and commonly called *gutta roſea.* He has ſo often found cutaneous connected with calculous complaints, that he is induced to infer, that the ſame conſtitutions are liable to both. This is more particularly the caſe with thoſe impetiginous affections which depend on an hereditary conſtitution, and incident to what is called a ſcorbutic habit. Cutaneous complaints, it is remarked, are ſtill oftener connected with complaints of the ſtomach. All the excretions of the ſkin which the author has examined by the uſual teſts, have ſhewn an acid character.

10. 'An Account of a ſingular Diſeaſe in the great Inteſtines: by Dr. *M. Baillie.*'—The patient in this caſe, after having ſuffered ſeverely from diſorder in the bowels, about three weeks before her death voided a ſubſtance reſembling gut, above a yard in length. For ten days before the paſſing of this ſubſtance, and always after that time, till ſhe died, ſhe could have no evacuation from the bowels, unleſs held up nearly in an erect poſture. Upon examination of it in the moſt attentive manner, Dr. Baillie was convinced that it was really a portion of the colon. The inner membrane, the circular muſcular fibres, the peritonæal coat in ſome places, the appendiculæ epiploicæ, and a part of the longitudinal bands, were diſtinctly to be ſeen. The body was not examined after death.

11. 'An Account of an uncommon Tumour, formed in one of the Axillary Nerves: by Mr. *Home.*'—The tumour here deſcribed was found to be encloſed in a nerve, and from that circumſtance was attended with circumſtances of a peculiar kind. The caſe is as follows:—'A lady, twenty years of age, had a tumour on the outſide of the biceps muſcle of the right arm, juſt below the middle. It was of the ſize of a ſmall pullet's egg, of an elliptical form, and moveable in the ſurrounding parts, but principally in a lateral di-

 rection.

rection. It was extremely painful when any thing preffed againft it, which made her very careful in defending it from external accident. It had been feveral years in arriving at this fize, but was now increafing more rapidly, which induced her to fubmit to have it removed. The operation was performed by Mr. Hunter, in which I affifted him. In the operation, handling the tumour, or moving it from its place, gave the moft excruciating pain. When the tumour was fully expofed, it had a fmooth fhining external furface, and terminated at its *upper and lower* ends in a ftrong white chord, which proved to be the mufculo-cutaneous nerve: upon cutting into the tumour it was difcovered to be inclofed in the nerve. This difcovery was not made till the tumour had been every where laterally diffected from the furrounding parts; it was, therefore, thought prudent to remove the whole, by dividing the nerve at the two ends of the tumour. The artery belonging to the nerve bled fo freely, that it became neceffary to apply a ligature on both the cut ends of the nerve, as the artery itfelf could not be got at. An attempt was made to heal the wound by the firft intention, which did not fucceed; but it got well as foon as wounds of that fize ufually do,—by fuppuration and granulation. The patient loft the ufe of her forefinger and thumb, and there was a numbnefs in all the parts fupplied by that nerve. The fkin which covered them was unufually rough and dry, and the cuticle came off in fmall fcales. Before the operation the pain was not confined to the tumour, but extended to all thefe parts. On examining the tumour, it was found that three inches in length of the nerve had been removed; that it was divided into two portions, each of them very much flattened, and paffing over two oppofite fides of the tumour. There was alfo a nervous expanfion not thicker than a common membrane, which completely invefted the whole of the tumour; and, when that was divided, it could be readily feparated every

where,

where, except at the *extremities*, where the connexion was ſomewhat ſtronger.

'When the tumour was divided, and the cut ſurface accurately examined, it had the appearance, in the centre, of ſerpentine nervous fibres running in the courſe of the nerve. Theſe were ſeparated from each other, and the interſtices filled up with the ſubſtance of the tumour; but that part of the tumour which was exterior to theſe fibres had ſomething of a radiated ſtructure.

'Peter Coillot, a Frenchman, thirty-five years of age, was admitted a patient under my care in St. George's Hoſpital, July 13th, 1796, with a tumour, *which was ſituated in the middle of the hollow*, between the two folds of the *arm-pit*. When the arm was hanging down it projected very little; but, when the arm was raiſed, it became very prominent, that poſition of the parts bringing the tumour forward. It admitted of lateral motion, which was, however, very confined, being juſt ſufficient to aſcertain that it had no firm connexion with the parts behind.

'The firſt ſymptom which he felt was a darting pain in the fingers of that hand. This came on in July, 1795, and increaſed from that time; but the tumour in the arm-pit was not diſcovered till June, 1796, and was then as large as a ſmall pullet's egg: when he came into the Hoſpital, it was more than double that ſize. The pain he felt in the tumour and in the arm was very ſevere. This was very much encreaſed by any preſſure againſt the tumour.

'Its relative ſituation to the great nerves and blood-veſſels, its obſcure motion, and the uncommon degree of pain which it occaſioned, were unfavourable circumſtances for an operation. I was, therefore, induced to try a variety of means to relieve the ſymptoms; but theſe proving ineffectual, and the pain becoming worſe, the removal of the tumour ſeemed to be the only means left that could give him a chance of getting well. To this the man moſt cheerfully

ſubmit-

ſubmitted, as he declared that his preſent ſufferings were inſupportable.

'During the operation the arm was raiſed as high as poſſible, to bring the tumour fully into view. Upon dividing the ſkin and the cellular membrane, the firſt object which preſented itſelf was the axillary vein ſtretched over the anterior ſurface of the tumour: this was drawn to one ſide, and retained in that ſituation. When the tumour was laid bare, it was found to have a ſmooth external ſurface, and the end next to the arm terminated in a ſtrong white chord. When this was pulled, it did not give pain in the part itſelf, but the arm felt overſtretched, *and gave* him the greateſt uneaſineſs. This circumſtance brought to my recollection the caſe of the young lady above related, and led me to conſider this to be ſimilar to it: I, therefore, cut through the external covering of the tumour, which was only a thin membrane, and diſſected off a conſiderable portion of it. This enabled me, with the finger, to detach the remainder of the tumour from its covering, and entirely to diſengage it; upon which it was immediately expelled by the action of the ſurrounding muſcles. No hæmorrhage enſued, and the parts were ſuperficially dreſſed. The patient, immediately after the operation, felt relieved from the diſtreſſing ſymptoms he before complained of.

'The tumour was of a yellowiſh white colour, about three inches and an half long, two inches thick, and of an oval form. When cut through, it was found to conſiſt of a whitiſh very firm ſubſtance, in the centre of which there was a very obſcure fibrous ſtructure; and towards the outer ſurface the texture was indiſtinctly radiated. The day after the operation the patient was free from pain, and could move his fingers without uneaſineſs. He continued going on well till the fourth day, when he loſt his appetite, had an unuſual heat in his ſkin, and his *pulſe exceeded its natural frequency*. On the fifth day he was nearly in the ſame ſtate; on the ſixth his pulſe was *quick*, and had

had a ſharpneſs in the ſtroke: his ſkin felt hotter than before, and he had a præternatural thirſt; his ſpirits were depreſſed, and he felt perſuaded that he ſhould not recover. On the next day in the forenoon he died.

‘ On examining the parts after death, the tumour was found to have been incaſed in one of the large nerves which form the axillary plexus: the principal ſubſtance of the nerve paſſed along the poſterior ſurface of the tumour. There were, alſo, ſome other branches much flattened, and, as it were, imbedded in the nervous expanſion ſurrounding the tumour.’ The cyſt was now much contracted, and more than four times thicker than at the time of the operation. *In conſequence of having been inflamed,* the cavity was lined with coagulated lymph, and almoſt filled with coagulated blood, as ſuppuration had not completely taken place. The inflammation and ſwelling had extended ſome way into the ſurrounding parts, which were alſo conſolidated into one maſs, and with difficulty ſeparated by diſſection.’

From theſe caſes, Mr. Home obſerves, we *are enabled to aſcertain* the ſymptoms peculiar to tumours in the ſubſtance of nerves, and to form a judgment reſpecting the mode of removing them. They may be diſtinguiſhed *from other tumours* by a pain which is felt in the direction of the tumour, and in the part beyond it, even at the time when the tumour itſelf is moveable laterally in the ſurrounding parts. They may be alſo diſtinguiſhed by the motion of the tumour, being chiefly in a lateral direction, but not in the direction of the nerve to any extent; and by the attempt to produce this longitudinal motion being attended with conſiderable pain. In the removal of ſuch tumours, we find that, ſo far as we are juſtified in drawing concluſions from two inſtances, the taking away three inches of a nerve is productive of leſs violent effects than are occaſioned by inflammation and ſuppuration in the ſubſtance of the nerve for an equal extent.

extent. The inflammation of a nerve, like that of a tendon, appears to affect the general ſyſtem in a greater degree than would be expected, by a man unacquainted with pathology, from the little ſeverity of the ſymptoms, or ſenſation in the part affected.

The remaining articles of the volume are too valuable to be haſtily paſſed over. Theſe, therefore, we reſerve for our following Number.

ART. XV. *Medical Facts and Obſervations. Volume* VIII.

(Continued from page 72.)

6. 'CASE of Gangrenous Stomach, with Dyſphagia, from Lightning: by Mr. *Patrick Paterſon*, Army-ſurgeon.'—Though the patient in this caſe felt a ſudden alarm or ſhock from lightning a day or two previous to his illneſs, yet, as this was ſlight and momentary, there ſeems little reaſon to ſuppoſe it had any connexion with his complaint, which was that of inability to ſwallow, and a ſtate of the ſtomach ſo inirritable, as not to be affected by the moſt active emetics. It is remarkable that none of the ſymptoms of acute gaſtritis were preſent at any period of the diſeaſe.

7. 'An Account of the good Effects of a Decoction of Peach-leaves in ſome Affections of the Urinary Paſſages: by Sir *William Biſhop*, Knight, Surgeon at Maidſtone, in Kent.'—A caſe of ſuppreſſion of urine is here related, ariſing from calculi obſtructing the ureters, and which could not be permanently relieved, though a variety of the moſt powerful remedies were had recourſe to; as the uva urſi, the mephitic alkaline water, &c. The uſe of the peach-leaves was ſuggeſted by the practice of an empiric, and a decoc-

decoction of them was exhibited, of which a pint was taken daily; and at the end of thirty hours the patient began to void clear natural urine, and in a few days recovered. On various flight returns of the complaint the fame remedy was reforted to with advantage; and it has been employed fuccefsfully, the author obferves, in a number of other inftances. An ounce of the dried leaves were boiled in a quart of water, till reduced to a pint and a half.

8. ' A Cafe of Lithotomy, attended with fome remarkable Circumftances: by Mr. *William Wickham*, Surgeon of the Winchefter Hofpital.'—The ftone in this cafe weighed three drachms; and was of fuch a fhape, that its fmall end was preffed into the neck of the bladder, fo as to prevent the entrance of the ftaff fufficiently for the performance of the operation. The patient died, and on diffection the ftone was found loofe in the cavity of the bladder, although on various trials with the found it was found impoffible to pafs the inftrument forwards. It appears, therefore, to have been forced into the neck of the bladder, during life, by the ftrong contraction of the coats of this organ. The author thinks the operation might have been performed with fuccefs, had it been attempted by cutting upon the end of the ftaff, paffing a probe-pointed knife by the fide of the ftone, and then extracting by the forceps, in the manner employed by Mr. Abernethy.*

9. ' Two Cafes of Hernia Congenita: by Mr. *Henry Fryer*, Surgeon at Stamford.'—Thefe cafes fhew that hernia inguinalis may take place, although the tefticles may not have defcended into the fcrotum, nor have paffed the ring. In fuch inftances the wearing of a trufs becomes equally neceffary as in others.

10. ' Cafe of Imperforate Hymen: by the fame.' —This cafe offers nothing uncommon.

* See *Earle* on the Stone, page 75.

11. ' Cafe

11. 'Caſe of Fungus from a Wound in the Ear: by the ſame.'—A boy had his ear torn nearly half through, in conſequence of a fall from a horſe. In a few days a fungus began to ariſe on the divided parts, and ſoon acquired the ſize of half an orange. The common cauſtics, as blue vitriol, lunar cauſtic, &c. having failed to deſtroy it, the author applied ſome arſenic and antimony, ſprinkled on lint, which, after occaſionally being repeated, entirely removed the excreſcence.

12. 'Caſe of a Wound penetrating the Cavity of the Abdomen: by the ſame.'—A woman was thrown down in a farmer's yard, and gored by the horn of a cow.—'When I ſaw her,' the author obſerves, 'ſix hours after the accident, I found a very large quantity of the inteſtines had paſſed from the abdomen; but, at firſt, I could not proceed in my examination, ſo great an adheſion had taken place between the inteſtines and a ſilk handkerchief, which had imprudently been laid to them. Having, with very conſiderable difficulty, removed this, by ſoaking it well with warm water, the inteſtines were diſcovered prodigiouſly inflated, and with ſome appearance of inflammation, owing to the ſmallneſs of the opening made by the cow's horn. It was ſome time before I was able to introduce my finger into the orifice, and upon it a probe-pointed knife, with which I dilated the wound ſufficiently to ſuffer a ſtill larger quantity of the inteſtines to paſs out: this immediately reduced the ſize of them, ſo that, without much trouble, I was enabled to return the whole into the cavity of the abdomen, and then had an opportunity (which I had not before, from the number of folds that lay out) of examining more minutely at what part the wound had been made. This I found to be juſt above Poupart's ligament; and I alſo diſcovered that I had wounded the epigaſtric artery. With ſome difficulty I ſecured this veſſel; and the wound was then drawn together by two ſtitches, and ſlips of adheſive plaſter, and over theſe

theſe compreſs and bandage. I gave the patient fifty drops of laudanum, and directed her to take ſome caſtor oil the next morning. She continued very ill the whole of the next day, with a low trembling pulſe, great weakneſs, and pallid countenance, but without much pain. The oil was repeated, and two clyſters given, which on Tueſday morning produced ſufficient evacuations. From this time ſhe had no bad ſymptom; the wound digeſted kindly. She was kept entirely on nouriſhing liquid diet; the ſtate of the bowels was particularly attended to; an opiate was given at night; and, after ſome time, ſhe took decoction of bark.

'In ſix weeks the wound was healed, and ſhe gradually recovered her ſtrength. She was about ſixteen years old.'

13. 'A Caſe of hairy Concretions found in the human Stomach: by Mr. *William Wood*, Surgeon at Wingham, in Kent.'—This occurred in a young woman, about twenty years of age. She had laboured under chlorotic ſymptoms, attended with vomiting, and conſtipation of the bowels, for the ſpace of two years preceding her death. On diſſection, the ſtomach was found filled by two lumps of hair, in colour and texture much like her own, which, when ſhe was a child, uſed to be long, but lately her friends had taken notice that it was always ſhort. This, the author obſerves, in ſome meaſure accounts for the hair in her ſtomach, though no perſon ever ſaw her ſwallow any. The hair, in the maſſes, was cloſely matted together; and the dimenſions of the larger maſs were ſix inches and an half by three and an half; and of the other nearly as great.—A caſe ſimilar to the above may be found in the *Journal de Medecine* for 1779 (ſee London Medical Journal, vol. 4, page 361).

14. 'A Caſe of Ruptured Uterus, with the Appearances on Diſſection: by *Iſaac Cathrall*, M.D. of Philadelphia.'—It is remarkable, in this caſe, that delivery

livery was accompliſhed with tolerable facility by the natural powers, notwithſtanding the rupture of the uterus, which was not diſcovered till afterwards. After the expulſion of the child, the abdomen appeared augmented in ſize, and tenſe to the feel, as in tympanites. The patient complained of no other pain than ſtricture acroſs the thorax, with great difficulty in breathing, and a ſenſe of ſuffocation. Heat, thirſt, and full and ſtrong pulſe, were likewiſe obſerved. On examining *per vaginam*, the hand paſſed through an opening in the right ſide of the uterus into the cavity of the abdomen. The woman died the following day.

15. ‘ An Account of a Ruptured Uterus: by *John Sims*, M.D. London.’—This caſe, at the commencement of labour, was under the care of a midwife, who gave the patient expectations of a ſpeedy delivery. The labour pains, however, went off after a few hours, and did not again return. From this time no part of a fœtus could be felt on examination by the vagina. Her face and limbs became oedematous, and the belly was very large. A fetid black diſcharge took place from the vagina, and, after the lapſe of a fortnight, ſome of the nails and hair of a fœtus came away, followed by ſome ſmall finger bones. The fętid diſcharge continued for a month longer, when it entirely ceaſed, and the general health was faſt returning, when ſhe was perſuaded, by ſome fooliſh adviſer, that a good jumbling in a coach would bring on the labour, and rid her of her incumbrance. This was reſorted to: violent pain was in conſequence excited, with marks of inflammation, and ſhe died in two days afterwards. On examination after death, the bones of the fœtus were found lodged together in a cavity formed between the bladder and rectum, which had no communication, in conſequence of adheſions, with the general cavity of the abdomen. In the anterior part of the cervix uteri was a rent through its ſubſtance, about three quarters of an inch in length, the

the ſides of which were nearly contiguous, but ulcerated, and not diſpoſed to heal.

There is reaſon to ſuppoſe, Dr. Sims obſerves, that, if all violent motion had been avoided, this caſe might have terminated favourably. Conſiderable progreſs was made towards a cure, and the remaining ſteps neceſſary to complete the recovery are explained by the diſſection. All the ſoft parts of the fœtus, and even the cartilages, had been diſſolved by putrefaction; to which proceſs the fat ſeemed to be the leaſt diſpoſed, being diſcharged in the form of oil, after all the fleſh was diſſolved. The putreſcent matter being thus got rid of, and the patient's ſtrength, in conſequence, daily recruiting, the bones only remained to be expelled: a proceſs for this purpoſe ſeemed to be already commenced; the rough extremities of two of the bones had begun to irritate the integuments of the abdomen, at the navel, and would probably have made an opening there, at which the principal part of the bones might have been evacuated. The remainder, which had already, or might afterwards, have fallen to the bottom of the cavity, would either have made their way through the rupture of the uterus, and have been diſcharged as the others were, or, by their conſtant irritation, might have occaſioned a more immediate opening into the vagina, or the rectum. The membranous ſac lining the cavity which contained the bones, would have protected the inteſtines and other viſcera from the immediate contact of the external air.

16. 'Caſe of Prolapſus Ani cured partly by an Exciſion of a Portion of the inner Coat of the Inteſtine, and partly by the Introduction of a Wax Candle within the Cavity of the Rectum: by Mr. *Thomas Whately*, Surgeon in London.'—The mode of treatment here recommended was found effectual for the removal of a very troubleſome and obſtinate complaint. The chief part of the relief experienced ſeems attribu-

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table to the wax candle, which was of ſufficient length to extend beyond the ſphincter muſcle.

17. ‘ Account of the ſucceſsful Treatment of a large Swelling of the lower Jaw, with an Abſceſs in the Neck, occaſioned by ſupernumerary Teeth: by the ſame.’

18. ‘ An Account of a Mode of Practice which has been ſucceſsfully adopted, in Caſes of Diſtortion of the Pelvis, in pregnant Women: by Mr. *John Barlow*, Surgeon at Bolton, in Lancaſhire.’—In caſes of great deformity of the pelvis, where the expulſion or extraction of a living child is impracticable, it has been propoſed to bring on premature labour about the period of the ſeventh month, on the ſuppoſition that a child at this period has a tolerable chance for ſurviving; and the mother is by this means ſpared the pain and riſque of a very formidable operation. This mode of practice has, though not in many inſtances, been had recourſe to, and ſometimes with the happieſt effects to both mother and child. Its adoption would, no doubt, prevent nearly altogether the neceſſity of the Cæſarean operation; for conſiderable deformity of the pelvis is generally ſufficiently apparent, from various external ſigns that need not now be mentioned.

Several caſes are here detailed, which fully eſtabliſh the propriety of the practice; a practice which the author has purſued during ſeveral years with ſucceſs. He excites premature labour early in the ſeventh month, whenever he is conſulted in time by diſtorted patients. At this period of geſtation, the ſmaller ſize of the child's head, and the greater compreſſibility of its bones, render the completion of delivery eaſy, without the aſſiſtance of inſtruments; ſo that the mother is not expoſed to any peculiar hazard by the practice, and the child, at ſeven months old, has a ſufficient chance of ſurviving the birth. The author even thinks that labour might be brought on, with ſafety to the mother, at an earlier period, if the extreme deformity

formity of the pelvis ſhould require it. The particular mode of effecting his purpoſe is not pointed out; but it conſiſts in rupturing the membranes, which any cautious practitioner knows how ſafely to accompliſh. The following are the caſes given in illuſtration.

'*Caſe* 1.—The wife of John Smith, a woman rather advanced in life, of a delicate habit, and much deformed both in the pelvis and ſpine, had been delivered ſix times by the crotchet. In all thoſe labours the waters had been diſcharged ſeveral days (in two of them, ſix days) before delivery, after violent and almoſt continual pains. I brought on labour early in the ſeventh month, June 17th, 1783, and ſhe was delivered on the 21ſt, with common aſſiſtance: it was a footling caſe, and the child was born dead. On the 31ſt of July, 1784, I ruptured the membranes in the ſame woman, at the ſame period of pregnancy, and diſcharged the waters; ſhe was delivered on the 3d of Auguſt: the child was born before I arrived, excepting the head, which was brought away with common aſſiſtance.—This child was alſo dead. The width of the pelvis, in the narroweſt part, from the ſacrum to the pubis, I judge to be one inch and a half, and in the wideſt not more than two inches.

'*Caſe* 2.—The wife of Oliver Longworth had been twice delivered by the crotchet, after the waters had been diſcharged two or three days, during which ſhe was in almoſt continual and violent labour.

'Dec. 5th, 1787.—I brought on labour, and ſhe was delivered on the 7th.—The child lived three hours.

'Feb. 1ſt, 1790.—I again excited labour, and ſhe was delivered on the 4th.—The child was dead.

'Jan. 4th, 1793.—Labour was again brought on artificially, and delivery took place on the 6th. As ſhe lived in the country, the child was born before I arrived, and was dead. The pelvis of this woman was about two inches in diameter at the narroweſt part, and two inches and a half at the wideſt. It was otherwiſe diſtorted.

‘ *Caſe* 3.—The wife of John Walwork had been delivered four times by the crotchet; ſhe has ſince borne ſix children by premature labour: all were alive at the time of delivery, and three of them are now living. The narroweſt part of the pelvis, in this woman, was about two inches; the wideſt two inches and a half.

‘ Delivery took place, ſpontaneouſly, in one of theſe pregnancies, in the ſeventh month.

‘ *Caſe* 4.—The wife of George Jowel had been formerly delivered of two dead children; one by the forceps, the other by the crotchet. She has ſince borne three living children by means of premature labour, one of which died ſoon after the birth; the ſecond is now alive, and four years old; the third lived ten months. The pelvis of this woman, though not ſo much diſtorted as ſome of the others, was in no part above two inches and a half wide.

‘ *Caſe* 5.—The wife of Peter Blakely has had ten children; the firſt ſix were ſtill-born, five of whom were delivered by the crotchet. Since that time ſhe has borne four by premature labour; two of theſe were born dead, one lived an hour; the other is now four years old.

‘ A circumſtance well worth remarking took place reſpecting her laſt labour. Premature labour was excited three times by art, but in her laſt pregnancy it came on without any aſſiſtance. I ſhall not venture to aſſert, that the conſtitution had acquired the habit of expelling the fœtus in the ſeventh month, in conſequence of the preceding treatment; but if other inſtances of the ſame nature ſhould be obſerved, they would furniſh a ſtrong additional argument in favour of the practice which I have recommended.

‘ This woman was ſtrong and muſcular: the pelvis was not more than two inches and a half in diameter at the wideſt part.’

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The remaining articles of the volume are, Extracts frm the *Philoſophical Tranſactions* of London, and from the *Tranſactions of the Royal Iriſh Academy*; viz. Mr. *Home*'s paper on Hydatids; Mr. *Abernethy*'s, on the Anatomy of the Whale; Dr. *Heberden*'s, on the Influence of Cold on the Inhabitants of London; Dr. *Joſeph Clarke*, of Dublin, on the Diſeaſes of Infancy; and Dr. *Crumpe*'s Caſe of Worms diſcharged from the Stomach.

Art. XVI. *Obſervations on the Cow-pox. By* William Woodville, *M.D. Phyſician to the Small-pox and Inoculation Hoſpitals.* Octavo, 43 pages, price 1s. 6d. London, 1800. Phillips.

THE chief object of the author, in the preſent pamphlet, is to endeavour to refute an opinion advanced by Dr. Jenner, in his late publication on Cow-pox, viz. that the vaccine matter, with which the inoculations were carried on under the inſpection of Dr. W. at the Small-pox Hoſpital, was contaminated with that of the variolous; and that a hybrid or mixed diſeaſe was in conſequence thus propagated, both there, and in other places, ſupplied with matter from that ſource.

The author obſerves, that he has already publiſhed ſeveral experiments which ſhew that the cow-pox does not *hybridize* with the ſmall-pox, even when inoculation is performed with the matter of theſe diſeaſes intimately mixed together in equal quantities. He has diſcovered, he ſays, from repeated experience, that if the matter of cow-pox and that of ſmall-pox be inſerted in the arm of a patient, even within an inch of each other, ſo that on the ninth day the ſame effloreſcence becomes common to both the local infections, nevertheleſs, upon inoculating others with matter taken from the the cow-pock tumour, the vaccine diſeaſe is

invariably produced. And he is convinced from experience, that the matter thus taken would not be more liable to produce puſtules, or a leſs favourable diſeaſe, than matter procured directly from the cow.

It appears, from the ſtatement here given, that the matter employed by Dr. Jenner, in a great number of the caſes inoculated by himſelf and by Dr. Marſhall, as recited in his laſt work on the ſubject, was furniſhed by Dr. Woodville, and actually taken from the arm of a Hoſpital patient, who had three hundred and ten puſtules, all of which ſuppurated. This circumſtance, through ſome inadvertency, is not noticed by Dr. Jenner: and the author contends, that Dr. J. is not juſtified in ſaying, that eruptions ſimilar to thoſe deſcribed by Dr. Woodville have never been produced by the pure uncontaminated cow-pox virus.

Out of more than three hundred perſons inoculated by the Rev. Mr. Holt with cow-pock matter taken from the Hoſpital, no variolous-like eruptions were produced, except on two perſons, who had each one hundred puſtules. Again, the Rev. Mr. Finch, who was ſupplied by Mr. Holt with ſome of this vaccine matter, inoculated ſeven hundred and fourteen perſons, on none of whom did any puſtules, reſembling thoſe of the ſmall-pox, appear. Laſtly, the author obſerves, that the laſt matter of the vaccine poiſon, introduced by him into the Hoſpital, was obtained from Dr. Jenner: with this, on the ſame day, he inoculated three patients, on one of whom about one hundred variolous-like puſtules were produced. This inſtance, it is remarked, and many others of the like kind, decidedly prove, that where there can be no doubt entertained of the purity of the cow-pock matter, puſtules will frequently be produced. This, therefore, does not ariſe from any adulteration of the vaccine matter, or its mixture with that of ſmall-pox.

As, however, eruptions do not appear, or very rarely, in private practice, Dr. Woodville conſiders them as the effect of ſome adventitious cauſe, independent

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of the cow-pox: and this is, the variolated atmoſphere of the Hoſpital, which thoſe patients were neceſſarily obliged to inſpire during the progreſs of the cow-pox infection. How this variolous atmoſphere operates in producing the effect, he does not venture to conjecture. This opinion of the author, it may be obſerved, does not ſeem to agree well with his former remark, that eruptions rarely took place, if care was taken to avoid matter for inoculation from ſuch as had puſtules; a fact that cannot be explained on ſuch a ſuppoſition.

Since the author's former publication, the new inoculation has been extended to about two thouſand perſons, with none of whom did the infection occaſion a ſevere diſorder, or excite one alarming ſymptom. The proportion of caſes attended with puſtules in the Hoſpital has been of late only three or four in a hundred; in the author's private practice no eruptions at all have occurred. More than a thouſand of thoſe who have gone through the vaccine diſeaſe have been ſince inoculated with variolous matter, and not one has taken the infection.

The work is concluded by a few practical remarks of conſiderable value. Many have remarked, that inoculation with the vaccine matter is more apt to fail in communicating the infection than variolous matter, eſpecially if it be ſuffered to dry upon the lancet before it is uſed. This does not ſeem to depend, the author obſerves, upon the virus of the former being more volatile, but upon its becoming more hard and indiſſoluble upon exſiccation. Care ſhould, therefore, be taken to moiſten it a conſiderable time before it is uſed.

' When a conſiderable tumour and an extenſive redneſs take place at the inoculated part, within two or three days after the infectious matter has been applied, the failure of inoculation may be conſidered as certain, as where neither redneſs nor tumour is the conſequence. This rapid and premature advancement

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of the inflammation will always be ſufficient to prevent the inoculator from miſtaking ſuch caſes for thoſe of efficient inoculation. But there are other circumſtances under which I have found the inoculation to be equally ineffectual, and which, as being more likely to deceive the inoculator, require his utmoſt circumſpection and diſcrimination. I here allude to caſes in which it happens, that though the local affection does not exhibit much more inflammation than is uſual, yet neither veſicle nor puſtule ſupervenes; and in which, about the ſixth or ſeventh day, it rapidly advances into an irregular ſuppuration, producing a feſtering, or cruſtaceous ſore. Care, however, ſhould be taken to diſtinguiſh this caſe from that in which the inoculated part aſſumes a puſtular form, though it continue for one or two days only, when the ſame appearances follow as thoſe above deſcribed; for I have experienced the latter inoculation to be as effectual as where the tumour has proceeded in the moſt regular manner. Theſe obſervations, which, I hope, will be found uſeful to inoculators, are drawn from a conſiderable number of caſes, ſome of which created in my mind much anxiety for the reputation of the cow-pox; for until I had aſcertained the diſcriminating circumſtances here pointed out, I conſidered every new appearance of morbid action, which ſeemed to take place at the inoculated part before the uſual period at which the diſeaſe affects the conſtitution, as ſuggeſting a doubt with reſpect to the efficacy of the inoculation: hence I ſometimes judged it neceſſary to inoculate the ſame patient a ſecond, third, and even a fourth time. Some parents, however, were unwilling to ſubject their children to a repetition of the inoculation, and could not be prevailed on to comply without much difficulty, even where their refuſal might have been of fatal conſequence. I inoculated two children of the ſame family for the cow pox, the younger of whom was eighteen months, and the elder four years old. On the fourth day the redneſs of the

local

local affection in the elder extended to about one third of an inch, or more, in diameter; and no veſicle appeared. On the ſixth day the redneſs of the tumour was much increaſed. On the following day the tumour ſuppurated, and produced a ſuperficial ulcer for two or three days, when the induration and inflammation of the part wholly went off, and the ſore healed. In the younger child the progreſs of the infection was perfectly regular throughout all its ſtages, and the diſeaſe was extremely mild. On the ſixth day I told the parents of theſe children that the elder had not received the cow-pox, and that a ſecond inoculation would be neceſſary: at this they appeared ſurprized, and obſerved, that the inoculation had produced more effect upon the elder than the younger child. However, on the ninth day they ſuffered me to inoculate the elder in both arms, when each puncture produced the true vaccine puſtule, and the infection proceeded in the moſt regular manner.

'The time at which the cow-pox affects the conſtitution after the virus has been applied, appears to be differently ſtated by inoculators; according to my obſervations it correſponds nearly to that of the variolous inoculation: however, it not unfrequently happens, that a raſh takes place as ſoon as the local action of the infectious matter becomes evident. The efflorеſcence at the inoculated part, which ſeldom intervenes before the eighth, or later than the eleventh day, is to be regarded as an indication that the whole ſyſtem is affected; and if the patient has not felt any indiſpoſition on or before its approach, he may be aſſured that there will not be any afterwards. When efflorеſcence does not commence till the eleventh day, it is almoſt always attended with more indiſpoſition than when it occurs on the eighth or ninth day. The efflorеſcence is more frequent in young infants than in children advanced to three or four years of age; and the former have the efflorеſcence and the diſeaſe more favourably than the latter, inſomuch, that by far the greater

greater part of them have no perceptible illnefs, and require no medicines. On the other hand, in adults, the cow-pox frequently produces head-ache, pain of the limbs, and other febrile fymptoms, for two or three days, which are greatly relieved by a brifk purgative.

'After the local tumour has advanced fo far as to become a dry fcab, a few fcattered papulous or puftular eruptions fometimes appear: thefe, however, are feldom of long continuance, and the puftules rarely fuppurate; but when they do, the pus they contain is capable of producing the difeafe by inoculation. I have inoculated fome children for the cow-pox whofe parents have been defirous that two or three variolous-like puftules fhould be produced, which I have generally, though not always, been able to accomplifh, by taking a little of the vaccine matter from the inoculated part upon a needle, and with it making a flight puncture in thofe parts where it was wifhed the puftules fhould appear. This fhould be done about the eighth or ninth day, or when the efflorefcence commences. If recent variolous matter be ufed, inftead of the vaccine, the effect will be the fame.'

Art. XVII. *An Addrefs to the Public on the Advantages of Vaccine Inoculation: with the Objections to it refuted. By* Henry Jenner, *Surgeon. F.R.S.* Quarto, 19 pages, price 1s. 6d. London, 1800. Cadell and Davies.

THIS popular Addrefs is fufficiently well calculated to do away the prejudices which all great innovations in practice are fure of encountering, but which the vaccine inoculation has probably fuftained lefs of, than any project of equal magnitude. The large fcale on which the experiment is now carrying on, promifes foon to bring the difputes with regard to it to a fatisfactory termination.

To

To thoſe who have already much attended to the ſubject, the preſent work will not appear to contain any thing they were before unacquainted with.

Art. XVIII. *Some Obſervations on Vaccination, or the Inoculated Cow-pox. By* Richard Dunning, *Surgeon, Plymouth Dock.* Octavo, 122 pages, price 2s. 6d. London, 1800. Cadell and Davies.

THIS pamphlet contains the teſtimony of the moſt reſpectable of the practitioners of Plymouth and its neighbourhood, in favour of the new inoculation. The facts adduced in its ſupport correſpond in general with thoſe which have already been laid before our readers.

We paſs over ſome of the author's ſpeculations, which are not of the moſt ſober kind.

Art. XIX. *Reflections on the Cow-pox, illuſtrated by Caſes to prove it an abſolute Security againſt the Small-pox. By* William Fermor, *Eſq.* Octavo, 47 pages, price 1s. 6d. London, 1800. Robinsons.

THIS pamphlet, coming from the pen of an unprofeſſional writer, may on that account, perhaps, have the greater influence on public opinion. The title-page ſhews that it is altogether in favour of the new practice. A liſt of caſes is given, amounting to three hundred and twenty-ſix in number, which paſſed through the cow-pox. Of theſe, one hundred and ſeventy-three were afterwards inoculated with variolous matter; but without infection to any one of them. Six inſtances are adduced of perſons who, many years before,

fore, had suffered the cow-pox, and who were thereby rendered unsusceptible of the variolous impression both natural and artificial. And a few cases are mentioned which seem to shew, that small-pox is, in like manner, a preventative of the vaccine disease.

Mr. Fermor notices, as others have done, the greater difficulty of communicating the infection of cow-pox, and which he attributes to its superior mildness. He likewise inculcates the necessity of distinguishing accurately the genuine from the spurious kind.

ART. XX. *An Essay on the Analysis of Mineral Waters. By* RICHARD KIRWAN, *Esq. F.R.S. &c.* Octavo, 279 pages, price 7s. London, 1799. BREMNER.

AN acquaintance with the nature and properties of mineral waters is important in different points of view; but they have especially long attracted the attention of mankind, the author observes, by their medicinal powers. These, indeed, can only properly be inferred from their experienced effects: yet, even with this restriction, the knowledge of their contents must be deemed important, not only for the purpose of imitating such as are found beneficial, in countries where Nature does not afford them, but also for the purpose of discovering the medical powers and mode of action of certain ingredients taken in a certain proportion, and a given degree of dilution, with the long train of consequences that may in time be deduced from this knowledge.

The purpose of the learned author in the present work, is, to state, add to, and generalize, the improvements which have taken place of late years in the doctrines and processes of chemistry, by proposing new tests, and new limitations, of the powers of those already known, in cases where none were before determined,

termined, or where they were inaccurately aſſigned; alſo, by ſubſtituting more direct methods of inveſtigation to the random ones before employed, and various new modes of eſtimating the quantity of each of the ſubſtances diſcovered. That theſe objects have been attained in an eminent degree, it is almoſt ſuperfluous to ſtate. The analyſis of mineral waters, conducted according to the principles here laid down, is a matter of great difficulty, requiring not only an extenſive knowledge of the principles of natural bodies, but an attention to the niceties of manipulation, which few, we fear, will be found to command.

The work is divided into two parts: in the firſt, the ſubſtances which have been hitherto found in mineral waters are pointed out, together with the various teſts ſerving to diſcover and diſtinguiſh them. In the ſecond part, the author proceeds to explain the analyſis of mineral waters, ſtating the objections to which the common methods, by teſts, evaporation, and precipitation, are liable; and pointing out, at the ſame time, thoſe which can be beſt relied on. The proceſſes recommended to be employed are deſcribed with great minuteneſs and accuracy. To the whole are ſubjoined *Tables,* ſhewing, 1. the Quantities of real Acid contained in Mineral Acids of different Denſities: 2. the Quantities of Acid abſorbed by different Baſes: 3. the Quantity of each Baſe abſorbed by each Acid: 4. the Proportion of Ingredients in Neutral Salts: and, 5. the Length in Feet of a Column of common Air at different Barometrical heights, and different Temperatures.—From theſe we extract the following——

TABLE

TABLE OF THE PROPORTION OF INGREDIENTS IN NEUTRAL SALTS.

Carbonic Compounds.	*State.*	*Basis.*	*Acid.*	*Water.*
100 Parts of Aerated Tartarin . . .	Crystallized	41,	43,	16,
Common Salt of Tartarin, or Pearl-ash	Dry	60,	30,	6,
Aerated Soda.	Fully crystallized	21,53	14,42	64,
Do. Do.	Desiccated	59,86	40,05	. . . .
Aerated Barytes . . .	Natural or ignited	78,	22,	. . . .
Aerated Stronthian .	Natural or ignited	69,5	30,	. . . .
Aerated Lime . . .	Natural if pure, or artificial if ignited . . .	55,	45,	. . . .
Aerated Magnesia .	Crystallized	25,	50,	25,
Common Magnesia .	Dried at 80° . . .	45,	34,	21,
Aerated Volalkali	. . . .	In the ratio of 6 of salt to 13 fixed air. . . .	. . . . . .	. . . .
Vitriolic Compounds.				
Vitriolated Tartarin	Dry	54,8	45,2	. . . .
Glauber.	Fully crystallized	18,48	23,52	58,
Do.	Desiccated at 700°	44,	56,	. . . .
Vitriolated Volalkali	. . . .	14,24	54,66	31,1
Baroselenite	Natural and pure, artificial ignited	66,66	33,33	. . . .
Vitriolated Stronthian	Natural and pure, artificial ignited	58,	42,	. . . .
Selenite	Dried at 66° . . .	32,	46,	22,
Do.	Dried at 170° . .	35,23	50,39	14,38
Do.	Ignited	38,81	55,84	5,35
Do.	Incandescent . . .	41,	59,	. . . .
Epsom	Fully crystallized	17,	29,35	53,65
Do.	Desiccated	36,68	63,32	. . . .
Alum	Crystallized	12, ignited	17,66	51 of crystal + 19,24 in the earth
Do.	Desiccated at 700°	63,75	36,25	. . . .

Vitriols.

TABLE, *Continued.*

Vitriols.	*State.*	*Basis.*	*Acid.*	*Water.*
Of Iron..........	Crystallized	28 ♈ of ♂ = 12 metal	26,	38, + 8 of composit.
Do.	Calcined to redness	45,	41,93	13,07
Lead	....	75 calx = 71 metal ...	23,37	1,63
Copper	....	40 calx = 30 metal ...	31,	29,
Zinc.........	....	40 calx = 30 metal ...	20,5	39,
Nitrous Compounds.				
Nitre	Dried at 70°	51,8	44,	4, 2 of composit.
Nitrated Soda.....	Dried at 400°	40,58	53,21	6,21 of composit.
Do.	Ignited	42,34	57,55	....
Nitrated Volalkali .	....	23,	57,	20,
Nitrated Barytes ..	Crystallized	57,	32,	11,
Nitrated Stronthian	Crystallized	36,21	31,07	32,72
Nitrated Lime ..	Well dried, that is, in air	32,	57,44	10,56
Nitrated Magnesia .	Crystallized	22,	46,	22,
Muriatic Compounds.				
Muriated Tartarin .	Dried at 80°	64,	36,	....
Common Salt	Dried at 80°	53,	47 aque. 38,88 real .	......
Sal Ammoniac	Crystallized	....	......	....
Do..............	Sublimed ..	25,	42,75	32,25
Muriated Barytes ..	Crystallized	64,	20,	16,
Do.	Desiccated .	76,2	23,8	....
Muriated Stronthian	Crystallized	40,	18,	42,
Do.	Desiccated .	69,	31,	...
Muriated Lime....	Red hot ...	50,	42,	8,
Muriated Magnesia	Sensibly dry	31,07	34,59	34,34
Muriated Silver ...	Dried at 130°	75,	16,54	8,46 oxygen.
Muriated Lead	Crystallized	81,77 ♈ ♄	18,23	In the calx.
Do.............	Desiccated .	83, ♈ of ♄	17,	....

ART.

Art. XXI. *Obſervations on the Hiſtory and Cauſe of Aſthma; and a Review of a "Practical Enquiry on Diſordered Reſpiration;" in a Letter to* Robert Bree, *M.D. the Author of that Work. By* George Lipscomb, *Surgeon at Birmingham.* Octavo, 108 pages, price 3s. London, 1800. Johnson.

IN a prefatory addreſs to the public, the author alludes, obſcurely, to perſecutions which he has ſuffered, and to the loſs of friends which he has ſuſtained: but of the nature and cauſes of theſe we are ignorant; nor are they otherwiſe of importance here, than as giving us occaſion to remark, that his perſonal feelings ſeem ſo far to have influenced his pen in the preſent work, as to have cauſed him to adopt a manner and expreſſion towards his opponent not always the moſt decorous, and that borders on illiberality. Thus, in the concluding paragraph of his Preface, he remarks,—"As a literary controverſy, on a profeſſional topic, between a ſurgeon and a phyſician *reſident in the ſame town,* will, perhaps, be ſuppoſed to have ariſen from perſonal pique, envy, or jealouſy, it may be proper for him to obviate the poſſibility of any ſuch miſapprehenſion, by informing his readers, that Dr. Bree is *equally unknown to him as a gentleman and a phyſician.*"

After ſome verbal criticiſms on Dr. Bree's work, of a trifling nature, and which it is quite unneceſſary to dwell upon, the author calls in queſtion the aſſertion of Dr. Bree,—"That the pulmonary nerves being ſmall, the lungs have little ſenſation;"—and he aſks,—'Does the acuteneſs of ſenſation, then, depend on the ſize of the nerve expoſed to the influence of ſtimuli?'—We anſwer, the ſenſibility of parts is in general great, in proportion to the ſize of the nerves going to, and diſtributed on them. The little ſenſibility of the lungs, in

in their natural ſtate, is a matter almoſt univerſally allowed.

With more ſucceſs, we think, he attacks the following poſition of Dr. B. viz. that—“ Phthiſis and “ aſthma comprehend the features of every ſerious in-“ diſpoſition which can generally attack the lungs, “ and they illuſtrate mutually the character of each. “ It will be found, that in their regular, ſimple, and “ uncomplicated forms, the remedies of the one are “ the exciting cauſes of the other, and the cauſes of “ the one are reciprocally the remedies of the other.” —‘ In refutation of the former part of the ſentence, I ſhall only beg leave to remind you, that the diſeaſe called hydro-thorax appears juſtly intitled, by its oppreſſive ſymptoms, and fatal effect, to be ranked with aſthma and phthiſis, as, at leaſt, “ *a ſerious indiſpoſition*” affecting the lungs. If the poſition which you have advanced in the latter be admitted, it will, indeed, afford a moſt cogent reaſon for never attempting the cure of aſthma; ſince you have diſcovered, that ſuch an apparent benefit would neceſſarily be ſucceeded by a diſeaſe, to which you acknowledge that “ medical treatment is oppoſed, without hope, and “ without ſucceſs;” which, by the way, ſeems to render it extremely problematical whether you are acquainted with the exciting cauſes of aſthma; for, if the “ remedies of phthiſis” (according to your preceding remark) be the exciting cauſes of aſthma, and if phthiſis be an incurable diſeaſe, *What are its remedies?*—Again; in another place you have ſaid, that aſthma is “ excited by irritation,” and you *allow* it to proceed from “ various remote cauſes.”—May I aſk, then, which of the remedies employed for the removal of the *irritation* can you poſſibly dread as the exciting cauſe of phthiſis? and which of thoſe remote cauſes of the irritation you have alluded to do you conceive likely to remedy phthiſis?—Vinegar is one of the remedies for the paroxyſm, on the uſe of which you have laid a conſiderable ſtreſs: I have, therefore,

 ſelect-

ſelected it as the ground of another queſtion.—Do you conſider it capable of exciting phthiſis?—One more queſtion, and I have done. You have particularized "ſevere ſtudy" as one of the remote cauſes of a prediſpoſition to aſthma.—Do you think it would at all conduce to the cure of phthiſis?'

The author's ſuppoſition, and his authorities, that in *divers* the *foramen ovale* remains open, are, we believe, very queſtionable.—'As water,' he obſerves, 'is known to contain a much larger proportion of oxygen than is mixed with atmoſpheric air, may it not be ſuſpected, that a certain quantity of this neceſſary fluid is abſorbed into the ſyſtem during ſubmerſion?'—It has never been imagined, we believe, that aquatic animals, as fiſhes, decompoſe the water in which they live, in order to procure the neceſſary ſupply of oxygen; they merely abſorb that portion which is looſe and ſimply mixed with the water, probably in the form of atmoſpheric air: and hence it is that they ſoon ceaſe to live in water which has been exhauſted of its air by the air pump.

But without accompanying the author further in his criticiſms on Dr. Bree's work, we ſhall proceed to notice his own theory of aſthma, and the grounds on which he endeavours to ſupport it. In his opinion, the ſymptoms which occur in aſthma evince the preſence of acrimony of ſome kind in the circulating ſyſtem. Thus, frequency of the pulſe has been noticed by moſt writers as taking place at the commencement of the paroxyſm, and even as preceding it. After ſome hours the offenſive matter becomes partially removed, by being depoſited in the pulmonary veſicles, and the frequency of the pulſe diminiſhes in a correſpondent degree.

A tingling and heat in various parts of the body is another ſymptom which has been very generally remarked in this diſeaſe, declining at the ſame time when the frequency of the pulſe diminiſhes, and occaſioned,

caſioned, in the author's opinion, by the acrid quality which the blood has acquired.

'In order to account for the excluſion of the offending matter, we have only to reſort to analogy. Every organ of the body is exactly fitted to act upon, and to be acted upon by, peculiar modifications of matter. Thus, the liver is adapted to the ſecretion of bile *from* the blood; and is ſo organized, as to ſuffer an excitement, or a ſtimulus to perform that ſecretion, by the qualities of the blood. Theſe qualities being capable of great variation, the degrees of ſecretion muſt differ in proportion; and if any extraneous matter be, by any means, forced into the veſſels deſtined for ſecretion, ſuch matter will be expelled by an effort of Nature, which is always arouſed to rid itſelf of noxious or oppreſſive matter.'

'The effort of the heart and arteries is thus excited by the acrimony of the ſerum circulating through them in aſthma; and their extremities, partaking of the irritation, open their orifices, and exclude the offending matter. The circulation is then reſtored to a more natural ſtate, and remains ſo, until an increaſe of acrimony again ſtimulates the veſſels, and reinduces the paroxyſm.'

With reſpect to the manner in which this ſuppoſed alteration of quality in the fluids, or acrimony, is acquired, the author refers to the general doctrine of almoſt all writers on aſthma, viz. that it is always preceded by dyſpepſy as a prediſpoſing cauſe. When the ſtomach, by diſeaſe, or by a deficiency of any of the materials neceſſary to be employed in digeſtion, becomes incapable of performing that proceſs, a fermentation takes place, by which an acid is *neceſſarily* diſengaged. The acid thus formed may be ejected through the inteſtines, or it may be retained in the ſtomach and inteſtines, till the abſorbents, being ſtimulated, convey it with the chyle into the blood-veſſels. This acid, thus taken into the ſyſtem, the author conſiders as the real cauſe of aſthma, which he

N 2 defines,

defines, *an exceſſive contraction of the reſpiratory muſcles, excited by the irritation of acid ſerum effuſed from the pulmonary veſſels into the veſiculæ and bronchia.*

But he places his chief reliance, for the ſupport of his theory, on the obſervation of Dr. *Bache*, of Birmingham, who examined the different ſecretions of an aſthmatic patient, ſo long ago as the year 1784 *(ſee page 445 of our laſt volume).* In this caſe " the " matter perſpired ſmelt *ſour;* and when pieces of " bibulous paper were previouſly ſtained by a ſolu- " tion of litmus, and then applied to various parts of " the body, the exudation from each produced the " effect of a weak acid upon the colour; and when " the paper was made dry, and the edge of it applied " to the flame of a candle," it was " found to be a " weak touch-paper; but when immerſed in a ſmall " glaſs of water, in which a grain or two of vege- " table alkali had been previouſly diſſolved, and dried " a ſecond time, its property, as a touch-paper, was " greatly augmented."—This convinced Dr. Bache that an acid pervaded the whole of the circulating ſyſtem, and ſuggeſted the mode of cure by alkalies, which was adopted with ſucceſs.

Such is the theory of Mr. Lipſcomb reſpecting the proximate cauſe of aſthma: but it does not appear that he has confirmed it by any experiments of his own; nor has he witneſſed the beneficial effects of *antacid* remedies for its relief. To us, the doctrine here inculcated appears liable to, at leaſt, as many difficulties as that which it is intended to controvert; and we can neither ſee in the ſymptoms, their progreſs, nor their removal, whether ſpontaneouſly or by art, any thing like ſatisfactory evidence of its truth.

ART. XXII. *The Anatomy of the Gravid Uterus: with practical Inferences relative to Pregnancy and*

and Labour. *By* JOHN BURNS, *Surgeon in Glafgow.* Octavo, 248 pages, price 5s. London, 1799. LONGMAN, &c.

FOR many ages, Mr. Burns obferves, the art of midwifery was founded on falfe and miftaken doctrines. Even at prefent there are too many who attempt to practife it without any fixed and certain principles, proceeding upon a confufed jumble of directions, unconnected with each other, and arifing from no fure and evident fource. But it would not be difficult to fhew, that this profeffion is founded upon as firm a bafis as any other department of the healing art; and that, if the ftudent be well acquainted with the ftructure and action of the parts concerned in parturition, he requires no other direction in the practice of midwifery. It is not by reading and remembering formal rules alone, that the ftudent, when he comes to practife, is to excel in this department. Cafes may very early occur where thefe rules will not apply fo exactly as he expected, and where all his treafured knowledge will fail; but in no fituation can he be at a lofs, if well acquainted with the ftructure and action of the parts concerned in parturition. At all times he may, from this knowledge, draw unerring advice; and receive, from the very fymptoms and appearances which apprize him of danger, fuch direction as fhall enable him fully to acquit himfelf, and faithfully to difcharge that duty which he owes to his patient. In a word, as the author, with great truth, remarks, the anatomy and phyfiology of the gravid uterus is the bafis of all obftetric knowledge.

The beft works we at prefent poffefs on the anatomy of the gravid uterus, are deficient in thofe practical inferences and conclufions which are fo effential to the ftudent. This is efpecially the cafe with the celebrated work of the late Dr. William Hunter. It is this deficiency which the author of the prefent treatife aims at fupplying; and it is but juftice to add,

 that

that he has accompliſhed this in an eminent degree. The ſtudent in midwifery will here find inſtruction on many of the moſt important points of practice, diſplayed in a manner that cannot fail to command his attention, and convince his judgment. We take blame to ourſelves for having ſo long, through inadvertency, delayed noticing this ingenious work.

The author's plan, in the execution of his taſk, comprizes two general heads. Under the firſt, he points out the changes which the womb itſelf undergoes, with regard to ſize, figure, and relative ſituation; ſhewing the mechanical and ſympathetic effects which the gravid uterus produces on other parts of the ſyſtem. The ſecond head treats of the contents of the uterus, including the fœtus, cord, placenta, and membranes.

The changes effected during geſtation upon the fundus, cervix, and os uteri, are explained with much clearneſs and preciſion; by theſe we are enabled to aſcertain the exiſtence of pregnancy at an early period from conception. Immediately after the deſcent of the ovum, and, perhaps, ſome time before it, the uterus begins to enlarge at its upper part, or fundus. —' When this takes place,' the author remarks, 'it not only grows heavier, but alſo preſents a greater ſurface for preſſure to the inteſtines above: it, therefore, will naturally deſcend lower down in the pelvis, and thus project further into the vagina. In this ſituation the uterus will remain, until it becomes ſo much diſtended as to raiſe itſelf up by preſſing againſt the ſides of the pelvis. By introducing the finger into the vagina at this period, we can feel the os uteri prolapſing further than formerly; and this is conſidered as one of the moſt early marks of pregnancy, exiſting before the uterus can be felt by the hand above the pubis, and conſequently before it has ſwelled the abdomen. The belly is indeed tumid before this happens, but the ſwelling is chiefly occaſioned by the inflation of the inteſtines.

' Although

'Although the uterus, about the third month, has enlarged ſo much, as, notwithſtanding its prolapſus, to be felt riſing above the pubis, it yet is not this ſtretching which accoucheurs allude to, when they ſay that the uterus now begins to aſcend. By this they underſtand the elevation of the os uteri, firſt to its original height, and afterwards beyond it, which takes place whenever the body diſtends to a certain degree: becauſe, in proportion as the body of the uterus enlarges, and becomes too broad to be contained in the cavity of the pelvis, it muſt raiſe itſelf up, the brim being a fixed point which cannot yield. The whole of the uterus, therefore, mounts up, and the vagina becomes elongated. Until this aſcent of the uterus, the fundus and body form the whole of the cavity; but now the cervix begins alſo to be ſtretched out, ſo that by the end of the fourth month of pregnancy one quarter of its length has become diſtended, and contributed to augment the uterine cavity; the other three-fourths which remain projecting, become conſiderably ſofter, rather thicker, and more ſpongy. By introducing the finger into the vagina, at the ſame time preſſing on the lower part of the abdomen, to keep the uterus from riſing up, we may feel the expanded body of the womb; and by a kind of waving or circumgyration with the finger, we can now make it exhibit a ſpecies of rolling or circulatory motion. If the uterus be kept ſteady, we may alſo feel an obſcure fluctuation, from the water which it contains. In another month, one-half of the cervix is diſtended, and the reſt is ſtill more thickened, or the circumference of the projecting part greater: the uterus has alſo riſen further up; conſequently the vagina is more elongated. In the ſixth month the neck is ſtill more ſtretched; and, in the ſeventh, it is difficult to diſcover any projection from the body into the vagina, which is ſtill longer. At this time, by puſhing the finger higher up, we can diſtinguiſh the head of the child preſſing on the lower part of the uterus, which we can ſeldom

do before this. In the eighth month the neck is completely effaced, and its orifice is as high as the brim of the pelvis. The ninth month affects the mouth of the uterus chiefly; and, therefore, the changes in this period must be considered afterwards.

'These alterations of the cervix are discovered by introducing the finger into the vagina, and estimating the distance betwixt the os uteri and the body of the uterus, which we feel expanding out like a balloon.

'The mouth of the uterus is merely the termination or extremity of the cervix, and consists of two flat lips or margins, of the same consistence with the rest of the uterus. When the womb is not gravid, these are always open, and will admit the tip of the finger; but, soon after conception, the os uteri becomes closely shut up, except at the very margins, at the same time that it gradually becomes softer. In proportion as pregnancy advances, and the cervix stretches, the tubercles of its extremity, or its mouth, shorten, until they totally disappear; so that when the neck is fully distended, there can no longer be felt the thick margins of the os uteri. It is now quite flat, very thin, and irregular in its aperture; for, as the lips never unite closely at their very extremity or margin, it follows, that a small cavity (the bottom of which is the inner surface of the distended portion of the cervix) must, in all the months, be perceived. From the same cause there must always, in the end of pregnancy, be a small hole, from the complete developement of the parts, through which we might touch the membranes, were it not filled up with mucus.'

From these observations the following practical rule is deducible.—'When the cervix and os uteri are higher or lower than natural, by which I mean, than when unimpregnated; when the circumference of the cervix, or projecting portion, is increased, and its length lessened; and when the body of the uterus can be felt expanding, like a balloon; when the os uteri is softer, and the finger cannot be passed into it as formerly;

merly; and when the ſympathetic ſigns of pregnancy are preſent, we may pronounce the woman to be with child, and judge of the period by the facts already ſtated. We ought, however, not to be too confident for the firſt eight or ten weeks, becauſe then the cervix has not begun to diſtend, and the ſigns are more fallacious than afterwards.'

The obſervations which occur on Flooding are highly important and inſtructive. Floodings he divides into two principal ſpecies: that which proceeds from the inſertion of part of the placenta over the os uteri; and that where it is owing to a caſual ſeparation of the decidua, or placenta, when this is attached to its proper place. Reſpecting the former, the author obſerves,—' that about the ſeventh or eighth month the diſcharge of blood commonly appears, and continues violent for ſome time, until at laſt a coagulum reſtrains or diminiſhes it; but this coagulum ſoon gives way, and the flooding returns as furiouſly as ever, until at length the ſtrength decays, and faintings come on. This is the caſe in all floodings, let the cauſe from which they proceed be what it may; and, therefore, whatever we may ſuſpect, we cannot declare the placenta to be attached over the os uteri until we examine. By introducing the finger, we feel the ſpongy ſubſtance of the placenta lying acroſs the os uteri, at the ſame time that the under part of the uterus has a thicker feel than uſual. It requires, however, ſome attention to be certain that we really feel the ſubſtance of the placenta; for clotted blood retained about the aperture may deceive us; and it is not prudent, at firſt, to puſh much with the finger, or to turn it much about, becauſe we thus increaſe the bleeding. A little time, however, generally determines the matter. When flooding depends upon this cauſe, veneſection, cold, and the uſual remedies, may moderate or check it for a time; but the only radical cure is delivery. This, however, is, at firſt, difficult, or impoſſible, to be accom-

accompliſhed, from the tightneſs of the vagina, and the firmneſs of the os uteri. The beſt practice, therefore, is, to reſtrain the hæmorrhage by cold applications, or a plug, until the parts will more readily admit of diſtenſion.* We then introduce the fingers to dilate the os uteri, and either ſeparate the placenta, or puſh our hand through its ſubſtance;† after which, we lay hold of the feet, and deliver ſlowly. I ſay ſlowly, becauſe precipitation is uſeleſs, as well as dangerous, the body of the child acting as a plug, and reſtraining the bleeding.

'Delivery, then, is the only chance of ſafety, and this we begin as ſoon as the ſtate of the parts will admit us. Evacuation of the waters, which is uſeful in other ſpecies of flooding, is uſeleſs here, and ought never to be procured, unleſs as preparatory to delivery, when we are ready to perform it. The neceſſary prelude to this evacuation, namely, the ſeparation or piercing of the placenta, muſt increaſe the diſcharge, inſtead of abating it.

'Flooding, from any cauſe, and eſpecially from this one, is a moſt dangerous accident, and the greateſt riſk to which a pregnant woman is expoſed. Nevertheleſs,

'* Until this can be done, the danger is not great, becauſe, as long as the os uteri is firm and ſmall, the bleeding is, comparatively ſpeaking, inconſiderable. In this ſpecies of flooding the quantity of blood which is loſt marks the progreſs of labour, or the degree of dilatation; and whenever the flow is ſo great as to demand our immediate interference, we may be certain that delivery can readily be accompliſhed. The danger of the caſe, from immediate loſs of blood, and the eaſe with which we can operate, are exactly proportioned to each other. The propriety, therefore, of not interfering manually too ſoon, will readily appear; becauſe, at firſt, we may, by cold and plugs, moderate the hæmorrhage, until the parts admit of delivery; whilſt we ſhould inevitably increaſe the diſcharge, by beginning our operation prematurely, at the ſame time that we did not, by this conduct, gain one ſingle advantage.'

'† Puſhing the hand through the placenta is by no means ſo adviſeable as ſeparating it, where this can be done; becauſe the placenta, when attached over the os uteri, is generally leſs in circumference, and greater in thickneſs, than when attached to the fundus. We have, therefore, a great number of cells or veſſels to tear, and find it difficult to pull the child through the mangled placenta, which will continually interrupt us in our operation.'

thelefs, I firmly maintain, that it ought feldom to prove fatal, if the practitioner underftands his duty. It is melancholy to know, that this is an axiom not univerfally believed, and that thofe who lofe moft patients blufh leaft for their blunders. A flooding is not a cafe in which we may temporife; it is not one in which we dare delay. Reft, venefection, cold air, cold drinks, and apothecaries phials, may, with propriety, be trufted to in trifling cafes, or in bleedings which take place in the early months of geftation. Delay is here to be praifed, and operations ought feldom to be talked of; but in thofe awful hæmorrhages which take place in the end of pregnancy, no reliance is to be placed on the powers of phyfic, and procraftination, if it be not murder, is at leaft highly criminal. There is pofitively no excufe, at leaft in the generality of cafes, for the lofs of a patient from bleeding before delivery, when the pelvis is well formed. It is foolifh to fay, that delivery was impoffible, and death unavoidable, becaufe in every inftance where the flooding is fuch as to require delivery, it can be accomplifhed. When the neck is not fully dilated, when the mouth is firm, and its aperture fmall, reft, cold, and plugging, will reftrain the hæmorrhage until delivery can be effected. Until this can be done, the difcharge is in fmaller quantity, and the weaknefs produced lefs rapid, and lefs to be dreaded. I will not, perhaps, be far wrong, if I fay, the effect induced by the moderate lofs of blood, at this period, does good, becaufe it renders the os uteri more eafily dilated. I may have expreffed myfelf too ftrongly, but I think it unjuftifiable to permit the ftudent to believe that he fhall be blamelefs when he lofes a patient from this caufe, more than a furgeon who allows a patient to die from a wounded artery. I have known flooding prove fatal; but thefe inftances confirm me in my opinion, and give me additional caufe to lament, that too many who practife midwifery imagine that a wifh for the patient's recovery is fufficient

ficient to excuſe them from purſuing early, decidedly, and unremittingly, that courſe which alone can give ſafety.'

With reſpect to veneſection as a means of moderating uterine hæmorrhage, in the advanced periods of pregnancy, the author expreſſes his doubts as to its propriety. We cannot, he obſerves, be certain of checking it at this time, otherwiſe than by delivery; and this muſt be always attended with the loſs of a conſiderable quantity of blood; often as much as the woman can bear to loſe without fatal conſequences. It would not, then, be prudent, foreſeeing this, to detract blood, eſpecially as in the beginning we may moderate the hæmorrhage by other means. If veneſection were to be at all uſeful, it muſt, in a diſeaſe ſo obſtinate as this, be puſhed ſo far as to induce either deliquium, or a ſtate nearly approaching to it. If this be not done, it has no influence on the uterine veſſels. Now, every one muſt admit, that this leaves the patient in ſuch a condition as to render any further immediate loſs of blood extremely dangerous; and, in moſt caſes, the probability is, that a further loſs of blood muſt be ſuſtained.

Art. XXIII. *Obſervations on the Effects of various Articles of the Materia Medica in the Cure of Lues Venerea: illuſtrated with Caſes. By* John Pearson, *Senior Surgeon of the Lock Hoſpital, &c.* Octavo, 188 pages, price 4s. 6d. London, 1800. Callow.

THE ample opportunities which the author of the work before us has poſſeſſed, during many years, for inveſtigating the hiſtory and treatment of the venereal diſeaſe, cannot fail to render the fruits of his obſervation highly intereſting to practitioners; and we natu-

naturally expect to derive from hence much inftruction and information relative to the prefent contefted points of practice, viz. how far the acids, and other analogous remedies, which have been of late fo confidently ufhered into the world, merit the encomiums which have been beftowed on them; whether they really poffefs any claim to our regard, as antifyphilitic remedies; or whether, with the various boafted fpecifics which have, from time to time, been obtruded on the public, they are doomed to delude mankind for a while, and ultimately to bring difgrace, if not contempt, on their fupporters.

The object the ingenious author has had in view, is, to enable us to attain to fome degree of precifion, in eftimating the qualities of the various mineral or vegetable productions which have been recommended for the cure of the venereal difeafe; to afcertain whether any other fubftance than mercury be a true and certain antidote; and to what ends and purpofes any of the numerous medicines recommended may be employed, either in conjunction with mercury, or after the completion of a mercurial courfe. With thefe views, he relates the refult of his experience with a confiderable variety of fubftances, as the guaiacum, *radix chinæ*, farfaparilla, mezereon, cinchona, opium, and cicuta. Saffafras, *lobelia fyphilitica*, *aftragalus exfcapus*, and feveral others of inferior moment, muriated barytes, ammonia, and the various acids, have all been fubmitted by him to the teft of experience, the refult of which is here furnifhed. But it is not our intention to follow him in this varied route. The inefficiency of the greater part of thofe above fpecified is too well and too generally known to require this from us. We fhall, therefore, confine our attention to the articles moft promifing at the firft view, or fuch as are at prefent objects of difpute amongft practitioners.

The volatile alkali is a fubftance whofe fenfible properties might naturally lead one to predicate much

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in its favour, as an article of the Materia Medica; and its efficacy has been highly extolled on many occaſions. ‘ It was recommended,’ Mr. Pearſon obſerves, ‘ as a potent and certain remedy againſt lues venerea, by Monſieur Peyrilhe, more than twenty years ago; and this phyſician extolled it as a medicine of greater efficacy than mercury; always curing the diſeaſe, without injuring the health of thoſe who took it. An interval of ten years intervened between the publication of the firſt and ſecond edition of his work upon this ſubject: during this large portion of time, he and his medical friends were making frequent trials of the virtues of the new remedy he had introduced: he found his firſt reports confirmed by an ample number of ſubſequent experiments, and thus gained additional evidence of the efficacy of this preparation. Such are the authorities upon which the volatile alkali was confidently propoſed to the world, as a new and certain ſpecific againſt ſyphilis.’*

‘ This author maintains, that the lues venerea muſt be cured by exciting a fever; that mercury, by its peculiar ſtimulus, can produce the proper febrile ſtate of the ſyſtem, but that the volatile alkali is preferable to it: and he confidently affirms, that an inflammatory fever has many times radically cured the moſt ſerious and inveterate venereal complaints.’ (P. 75.)

Upon this opinion, Mr. Pearſon makes the following remarks: ‘ I feel myſelf very little intereſted in the theories which may be propoſed, of the *modus agendi* of volatile alkali, or of any other medicine; provided ſuch ſpeculations do not corrupt the hiſtory of the diſeaſe, nor ſanction an inadequate or pernicious mode of treating it.

‘ But, if it were to become a prevailing opinion, that a fever being the cure of lues venerea, whatever medicine could excite and ſupport a febrile com-

* Remede nouveau contre les Maladies Veneriennes.

motion

motion in the human frame, would operate as a ſpecific remedy in the cure of that diſeaſe; ſuch a propoſition, reduced into practice, would be attended with the moſt miſchievous conſequences.

'The preceding pages contain ample proofs, that certain medicines have a power of interrupting the progreſs, and of altering the appearances of venereal ſymptoms, without actually curing the diſeaſe; hence it is probable, that mutations in the ſtate of the ſyſtem, of different kinds, whether occaſioned by the efforts of Nature, or produced by general diſeaſes, may modify the action of the venereal virus, ſometimes to the advantage, and at other times to the diſadvantage, of the patient.

'To be acquainted with theſe circumſtances, as matters of fact, will be highly uſeful to every practical ſurgeon; yet, if any one ſhould undertake to model a ſyſtem upon ſuch anomalies and unuſual occurrences; or ſhould ſlight or diſparage a well-known and efficacious method of treating the diſeaſe, becauſe it may lie within the ſphere of poſſibilities, that a commotion (not to be defined) excited in the animal body, can remove certain appearances ſeemingly connected with the infection; it may be fairly queſtioned, whether the underſtanding or the probity of ſuch a perſon be moſt worthy of animadverſion.'

The author's own experience of the virtues of the volatile alkali is deſcribed as follows: 'Many years before I read M. Peyrilhe's work, I had been accuſtomed to give volatile alkali, in large doſes, to ſuch venereal patients as ſuffered ſeverely from the dolores oſtocopi; and the medicine was very often uſeful to them; but I never ſuſpected it of poſſeſſing the important quality of an antidote to the virus. After I became acquainted with the opinions maintained in that work, I paid more attention to the effects of the ammonia; and no long ſpace of time elapſed, before I obſerved, that, like other diaphoretic medicines, ſuch as antimony, pulvis ipecacuanhæ compoſitus, antimony

antimony combined with opium, warm-bathing, &c. it ſuſpended the progreſs of ſome venereal ſymptoms, and removed others; but that no permanent benefit was obtained by uſing it.

'The volatile alkali will often relieve pains of the limbs: it will ſometimes remove a venereal eruption; and even reſtrain for a time the progreſs of the diſeaſe: but, at other times, the virus will continue its deſtructive courſe, during the adminiſtration of this medicine; and the ſymptoms which were apparently cured, never fail of returning again, while the patient is actually perſiſting in taking full doſes of this pretended ſpecific.'

Some remarks next occur on the preference due to different forms of mercurial remedies. With regard to the corroſive ſublimate, the author obſerves, that when this is given to cure the primary ſymptoms of ſyphilis, it will ſometimes ſucceed; more eſpecially when it produces a conſiderable degree of ſoreneſs of the gums, and the common ſpecific effects of mercury in the animal ſyſtem. But it will often fail of removing even a recent chancre; and, where that ſymptom has vaniſhed during the adminiſtration of corroſive ſublimate, he has known a three months courſe of that medicine fail of ſecuring the patient from a conſtitutional affection. And the reſult of his obſervation is, that ſimple mercury, calomel, or calcined mercury, are preparations more to be confided in, for the cure of primary ſymptoms, than corroſive ſublimate. The latter will often check the progreſs of ſecondary ſymptoms very conveniently, and is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the deſquamation of eruptions. Yet, even in theſe caſes, it is remarked, it never confers permanent benefit; for new ſymptoms will appear during the uſe of it; and, on many occaſions, it will fail of affording the leaſt advantage to the patient, from firſt to laſt. The author,

author, therefore, only employs this preparation either at the beginning of a mercurial courſe, to bring the conſtitution under the influence of mercury at an early period; or during a courſe of inunction, with the intention of increaſing the action of ſimple mercury; or, laſtly, after the concluſion of the frictions, to ſupport the mercurial influence in the habit, in order to guard againſt the danger of a relapſe. But in no caſe does he think it ſafe to confide in this preparation, ſingly and uncombined. Calomel and frictions ſeem to be the preparations on which he places his greateſt reliance.

Much the ſame character is given of mercurial fumigations. Where checking the progreſs of the diſeaſe ſuddenly is an object of great moment, where the body is covered with venereal ulcers, or where the eruptions are large and numerous, ſo that there ſcarcely remains a ſurface large enough to abſorb the ointment, the application of the vapour of mercury is attended with evident advantage.

A chapter is devoted to obſervations on ſome of the effects of mercury. The author here inculcates the neceſſity of continuing the frictions aſſiduouſly, till the ointment be abſorbed; obſerving, that the operation is beſt done by the patient himſelf. Expoſure to cold and cool air, he conſiders as checking the beneficial operation of mercury: at the ſame time it is the moſt powerful means of moderating ſalivation, when this proceeds to exceſs.

With reſpect to the acids, as antiſyphilitics, the author obſerves, that, during the laſt two years, he has paid particular attention to the powers of the vegetable acid in venereal caſes; but he has not witneſſed a ſingle inſtance, in which they proved competent to the removal of any one venereal ſymptom. Of the mineral acids, the account is not much more favourable. From the uſe of the vitriolic, Mr. Pearſon has ſeen the progreſs of venereal ulcers

of the tonſils evidently arreſted; and ſometi venereal eruptions will fade, and nearly diſappe during the uſe of it: but theſe effects are never p manent.

Four caſes are related, where the nitrous acid w given with advantage, one of gonorrhoea, and others of lues, in the primary ſtage of chanc Theſe got well under the uſe of this acid; but w ther the cures were permanent, was not aſcertain Eleven others are detailed by the author, and th furniſhed by Dr. Baillie, in all of which the nitr acid was unſucceſsfully employed.

Upon the whole, the author's experience leads l to the following general concluſions, as the reſul his enquiries on this ſubject:

'1. The guaiacum, ſarſaparilla, mezereum, green rind of the walnut, opium, and Peruv bark, have often removed ſome of the primary ſecondary ſymptoms of lues venerea, and have a viated others. They are, likewiſe, each of th capable of removing certain ſequelæ of lues vene where the farther adminiſtration of mercury wo prove injurious. Yet no ſatisfactory ſeries of evide can be adduced, demonſtrating that any, or all th vegetables, given ſingly, or combined, are compet to the eradicating of lues venerea from the ani body.

'2. It muſt be conceded, that certain indubita ſymptoms of ſyphilis have diſappeared, during courſe of the vegetable remedies; but the fa ſymptoms have generally recurred, even at the v time when the patient was taking largely of medicines which had produced this temporary bene Even where the patient has remained apparently w during five or ſix weeks, the diſeaſe has, neverthel always returned; and what is worthy of particu attention, the ſame ſymptoms preciſely have recurr which had been ſeemingly cured during the ad niſtrat

niſtration of the medicines alluded to. This fact may be conſidered as a proof, that venereal ſymptoms are not cured by them, in any proper ſenſe; becauſe local appearances admit of a perfect cure by a mode of adminiſtering mercury, which ſhall, nevertheleſs, be inſufficient to ſecure the conſtitution.

'3. The muriated barytes, and two of the mineral acids, when given to venereal patients, have a power of ſuſpending, for a limited time, the progreſs of the diſeaſe, and of removing many ſecondary ſymptoms; but they are not equal to the ſubduing of the virus, and freeing the conſtitution entirely from the effects of that deſtructive malady. They may, likewiſe, be employed with great advantage in thoſe phagedenic ulcers of the genitals, and of the groin, which may be claſſed among the ſequelæ of ſyphilis.

'4. The nitric and nitrous acids have removed both the primary and ſecondary ſymptoms of ſyphilis; and, in ſome inſtances, it ſeems, that the former has not recurred, nor have ſecondary ſymptoms appeared, at the period they commonly ſhew themſelves, when the cure has been imperfect. But, as far as my own experience extends, and that of many reſpectable friends, who are connected with large Hoſpitals, a permanent cure has never been accompliſhed by theſe acids, where ſecondary ſymptoms have been preſent.

'The ſame acids, when exhibited with the utmoſt care and attention, to many patients labouring under the primary ſymptoms of the venereal diſeaſe, and where they have agreed perfectly with the ſtomach, have been, nevertheleſs, found inadequate to the cure of thoſe ſymptoms. Indeed, the failures which have occurred, both in my own practice and that of many of my ſurgical friends, have been ſo numerous, that I do not think it eligible to rely on the nitrous acid in the treatment of any one form of the lues venerea.

'But, while I am obliged thus to detract from th ſuppoſed merits of the nitrous acid, as an antido againſt lues venerea, I would by no means wiſh ſee it exploded, as a medicine altogether uſeleſs that diſeaſe.

'Where an impaired ſtate of the conſtitution re ders the introduction of mercury into the anim ſyſtem inconvenient, or evidently improper, the nitro acid will be found capable of reſtraining the progr of the diſeaſe, while, at the ſame time, it will impro the health and ſtrength of the patient. On ſom occaſions, this acid may be given in conjunction wi a courſe of mercurial inunction; and it will be foun to ſupport the tone of the ſtomach, to promote th appetite, to determine powerfully to the kidnies, an to counteract, in no inconſiderable degree, the effec of mercury on the mouth and fauces. Theſe adva tages are by no means unimportant; and certain intitle the gentlemen, who have been active in pr moting the introduction of this acid into gene practice, to the gratitude of the public.

'I will not preſume, however, to aſſert, that w have yet learnt all that can be known of the b mode of exhibiting this medicine; nor will I ſuppo that we have arrived at the *ne plus ultra* of virtue. Yet, in the preſent ſtate of our informati upon this ſubject, it would by no means be warran able to ſubſtitute the nitrous acid in the place mercury, for the cure of venereal complaints; nor permit the knowledge we have gained reſpecti ſome uſeful properties of the former, to ſeduce us reject what a long courſe of experience has taught of the certain efficacy of the latter.'

AR

Art. XXIV. *An Enquiry into the Symptoms and Cauſes of the Syncope Anginoſa, commonly called Angina Pectoris; illuſtrated by Diſſections. By* Caleb Hillier Parry, *M. D. Phyſician to the Bath General Hoſpital, &c.* Octavo, 167 pages, price 4s. 6d. London, 1799. Cadell and Davies.

MORE than thirty years have now elapſed ſince Dr. Heberden, in the Tranſactions of the College of Phyſicians, of London, publiſhed a deſcription of a diſeaſe highly alarming as to its conſequences, and till then, as it ſhould ſeem, unnoticed amongſt phyſicians. One of the leading ſymptoms of this diſeaſe being a ſort of undeſcribable anguiſh acroſs the breaſt, he aſſumed that ſymptom as the foundation of a name, and called it *angina pectoris*. Notwithſtanding it has, ſince that time, attracted the attention of various obſervers, its pathology and method of cure have remained in much obſcurity. This has led the author of the work before us to attempt an inquiry into the nature and cauſes of this affection, as they are deducible from the actual ſymptoms, and from diſſection. With what ſucceſs his efforts to this end have been attended, will appear in the ſequel.

In the firſt chapter the author ſtates, that Dr. Jenner ſuggeſted, ſeveral years ago, that the angina pectoris aroſe from ſome morbid change in the ſtructure of the heart, which change was probably oſſification, or ſome ſimilar diſeaſe, of the coronary arteries. And in the ſecond chapter, three caſes are related, in which, with other morbid appearances, the coronary arteries were actually in an oſſified ſtate. The author has collected, with much diligence, all the real hiſtories of the diſeaſe which have hitherto appeared, but which, altogether, are very few; for he excludes various hiſtories of caſes that have been publiſhed under the title of angina pectoris; conceiving them

to be diſeaſes of a different nature. In order
underſtand the force of the author's arguments, it w
be neceſſary to give his hiſtory of the ſymptoms
what he conſiders as the genuine diſeaſe.

'Perſons affected with this diſeaſe,' he obſerv
'are ſaid to be uſually turned of fifty years of a
This, however, is not univerſally true, as appe
from the authors to whom I have referred; and
have lately ſeen a very clearly marked example of t
angina pectoris, in which the age of the patie
ſcarcely exceeded 40 years. The diſeaſe genera
attacks perſons of the male ſex; and, of them, th
who are inclined to corpulency. The firſt ſympt
is an uneaſy ſenſation, which has been variouſly de
minated a ſtricture, an anxiety, or a pain, extendi
generally from about the middle of the ſternum acr
the left breaſt; and, in certain ſtages of the diſord
uſually ſtretching into the left arm, a little above t
elbow. In ſome few examples the pain, ſtricture,
anxiety, is, in a certain degree, felt alſo acroſs t
right breaſt; and occaſionally, though I believe rare
has extended itſelf to one or both wriſts. The pa
which I have deſcribed occurs in paroxyſms; an
in the early periods of the diſeaſe, is ſeldom produc
without ſome apparent cauſe; ſuch as walking, p
ticularly up hill or up ſtairs, againſt the wind, or in
quick pace: on theſe occaſions, the patient feels
if perſiſting in the exertion would produce a to
ſuſpenſion of the powers of life. He, therefo
ſtands ſtill, or turns from the wind; on which t
uneaſy ſenſation ſoon vaniſhes. We are told of o
patient, who appears to have been, in other reſpe
a man of an unuſual firmneſs of mind, that he h
the reſolution to continue walking, and that he fou
the pain go off after it had affected him from five
ten minutes. This ſenſation in the breaſt often
mits of temporary relief, from the evacuation of wi
by the mouth, and is altogether ſo free and diſti
from any difficulty of breathing, that patients, duri

the paroxyſm, make a deep inſpiration with the utmoſt eaſe; and, in ſome inſtances, appear to be fond of ſighing deeply, and of retaining their breath. In ſome caſes, it is either conjoined with an unequal pulſe, or affects perſons who are ſubject to that ſymptom. In other caſes, the pulſe has been habitually ſo little changed, as to lead to the opinion, that the heart in no reſpect primarily ſuffers. But, whatever may be the ſtate of the pulſe as to regularity, I believe we ſhall always find it become more or leſs feeble, according to the violence of the paroxyſm.

'In the ſlighter caſes, and in the firſt ſtages of this diſorder, the fit ſeldom comes on but from the exertions which I have mentioned; and as it is probable that experience of their miſchievous effects will cauſe theſe exertions to be, as much as poſſible, ſhunned, patients will continue many days, and ſometimes weeks, without any attack of the diſeaſe. It has been obſerved, that paroxyſms are moſt apt to occur from walking, after a meal. In general they are not excited by exerciſe on horſeback, or in a carriage, or by ſome ſhort and partial though ſtrong exertions of the body itſelf, as in talking, laughing, coughing, or vomiting. They have been, by ſome, thought to occur moſt frequently in the extremes of hot and cold weather; but, in many inſtances, there has been no perceptible difference in this reſpect.

'As the diſeaſe advances, or in violent caſes, the paroxyſms ſometimes come on, or are much increaſed, from certain paſſions of the mind; from ſlow walking; from riding on horſeback, or in a carriage; from ſwallowing, ſpeaking, coughing, or ſtraining at ſtool; and ſometimes alſo they attack the patient from about two to four o'clock in the morning, or while ſitting or ſtanding, without any previous exertion, or obvious cauſe. The paroxyſms now alſo become more violent, and do not ſo readily recede. During the fit the pulſe ſinks in a greater degree; the face and extremities become pale, and bathed in a cold ſweat;

and, for a while, perhaps, the patient is deprived of the powers of fenfe and voluntary motion. At length, after the difeafe has recurred more or lefs frequently, fometimes during the fpace of many years, which admit of the patient's death from a variety of other caufes, a more violent attack, of the nature which I have juft defcribed, puts a fudden period to his exiftence.'

From thefe fymptoms, the author is led to confider the angina pectoris as in reality a cafe of fainting, or fyncope, which Dr. Cullen defines, "motus cordis imminutus, vel aliquamdiu quiefcens;" and as differing from the common fyncope only, in being preceded by an unufual degree of anxiety, or pain, in the region of the heart, and in being readily excited, during a ftate of apparent health, by any general exertion of the mufcles, more efpecially that of walking. A fpecific character of the difeafe is here given, founded in the idea mentioned.

The author next treats of the caufes of fyncope in general, both exciting and predifpofing; and then of the fuppofed caufe of fyncope anginofa, which he refers to a difeafed ftate, generally offification, of the coronary arteries of the heart. The rigidity of the coronary arteries, thus induced, may act, he thinks, proportionably to the extent of the offification, as a mechanical impediment to the free motion of the heart; and though a quantity of blood may circulate through thefe arteries, fufficient to nourifh the heart, as appears, in fome inftances, from the fize and firmnefs of that organ, yet there may probably be lefs than what is requifite for ready and vigorous action. Hence, though a heart fo difeafed may be fit for the purpofes of common circulation, during a ftate of bodily and mental tranquillity, and of health otherwife good; yet, when any unufual exertion is required, its powers may fail, under the new and extraordinary demand.

demand. In conformity with this notion, the author endeavours to ſhew, that the chief ſymptoms of the diſeaſe are the effect of blood retarded and accumulated in the cavities of the heart, and neighbouring large veſſels; and that the cauſes exciting the paroxyſms are thoſe which produce this accumulation; either by mechanical preſſure, or by ſtimulating, in an exceſſive degree, the circulating ſyſtem; in conſequence of which, the heart, weakened by the malorganization, readily ſinks into a ſtate of quieſcence, while the blood continues to advance in the veins. After this quieſcence has continued for a certain period, the heart may recover its irritability, ſo as again to carry on the circulation, in a more or leſs perfect degree, from the operation of the uſual ſtimuli; or death may, at length, enſue, from a remedileſs degree of inirritability in the heart.

This oſſified ſtate of the coronary arteries, which the author conſiders as the chief cauſe of the angina pectoris, may, he thinks, probably be referred to increaſed impetus of the blood, produced in various ways. A remarkable fact, on this ſubject, is mentioned by Boerhaave. He ſays, that oſſification of the aorta, in animals of the deer kind, is always found in thoſe which have been accuſtomed to running, and have been killed after a long chace; but never in thoſe which have led a quiet life in menageries. As induration, or oſſification of the aorta and valves, generally attends dilatation of that veſſel, it ſhould ſeem, the author obſerves, that theſe two ſtates have ſome important and neceſſary relation. It is certain, that ſuch maladies are moſt uſual in the male ſex; and, of them, in thoſe who uſe violent exerciſe.—Morgagni ſpeaks of their frequent occurrence in players on wind inſtruments; and in carmen or coachmen, and others who are accuſtomed to much jolting on horſeback. Theſe facts render it probable, that exceſſive momentum of the blood is capable of

of producing in the arteries dilatation and various degrees of induration.

With respect to the prognostic in this disease, if it be owing, as the author supposes, to induration of the coronary arteries, we have no reason to expect that it will ever suffer a radical cure: the operation of this cause may, however, be removed or suspended; and, for this purpose, the means of obviating inflammatory diathesis may have effect, particularly temperance in eating and drinking, and abstinence from violent bodily exertions. The other exciting causes, as passions of the mind, &c. must be particularly guarded against. It appears from experience, the author remarks, that some gentle and long-continued stimuli, as the Bath waters, have afforded considerable temporary relief in the syncope anginosa, the returns of the disease becoming thereby mitigated in violence and frequency. During the paroxysms, the most essential relief has been experienced from blood-letting. Stimulants are of doubtful utility, and the author has witnessed ill effects from their employment. The use of opium he has not tried.

We have now given a tolerably succinct view of Dr. Parry's opinions relative to angina pectoris, and the grounds on which he has been led to adopt them. How far they are satisfactory, or otherwise, we leave to the reader to determine. To us they appear not without difficulties. That the disease consists in irregular action of the heart, admits of little doubt; but that this is simply owing to deficiency or cessation of action, as is the case in common fainting, seems very questionable. The painful sensations which accompany the disease; the habit of body in which it most commonly occurs; the relief experienced from blood-letting; and the disadvantage accruing from the use of stimulating and cordial remedies, are all so many points of disagreement between those two affections;

affections; and consequently point out the impropriety of the designation which the author has employed. The term *angina pectoris* appears fully as expressive; and, at the same time, involves no hypothesis.

ART. XXV. *Sur le Memoir dans lequel M.* GIRTANNER, *examine si l'Azote est un Corps Simple ou Composé,* i. e. *Remarks on the Memoir of M.* GIRTANNER, *in which he inquires whether Azote be a Simple or a Compound Body. By M.* BERTHOLLET. *Ann. de Chym. No.* 103.

IN our last we entered much in detail into the Memoir of M. *Girtanner* above alluded to, wherein he endeavours to shew, both from reasoning and experiment, that *azote* is a compound of oxygen and hydrogen; and that the azotic gas left behind, in eudiometrical experiments, is a product of the operation, by no means previously existing in atmospheric air: a part of the oxygen being absorbed by the nitrous gas, the remainder combines with the hydrogen, one of the two components of atmospheric air, according to M. Girtanner, and forms the *azotic gas* which is found to remain.

It was not to be expected that a doctrine so novel, and which so materially influenced the received opinions on the subject, would be admitted without much caution and inquiry. Accordingly, we find M. *Berthollet* entering into the examination of the question with much warmth, and in the best possible manner, viz. by narrowly examining and repeating the experiments on which M. Girtanner had founded his hypothesis.

The fundamental experiment on which M. Girtanner endeavours to establish his doctrine, is the following: "When water is made to boil in a retort "of glass, or any other material, azotic gas is obtained."

"tained." And M. G. fuggefts thefe precautions: "in order to obtain azotic air, in the greateft quan-"tity, the evaporation of the water muft be made "to take place flowly, and over a gentle fire, which "muft not be fuddenly raifed."

An affertion fo pofitive determined M. *Berthollet* to repeat the experiment of M. Girtanner, with every precaution he had fuggefted. For this purpofe, he employed recently-diftilled water, and the well-wafhed precipitate of fulphate of alumine by potafh. He, likewife, repeated the experiment with an extremely white portion of *argil*, furnifhed by M. *Guyton;* but, although the quantity of water employed was confiderable, and confequently the experiments were of long duration, no azotic gas was difengaged, and the refult was precifely the fame as that of the Dutch Chemifts.

According to the idea of M. Girtanner, when we mix together oxygen and hydrogen gafes, we form atmofpheric air: the difference in fpecific gravity, and the nature of the products on combuftion, are mere trivial matters, of which M. Girtanner takes no account. M. *Bouillon-Lagrange* made a variety of experiments to the fame purpofe, and which are all in confirmation of thofe of M. Berthollet. Azotic gas was, in no inftance, produced.

This opinion of Girtanner is clofely connected with that of M. *Humboldt,* refpecting the abforption of oxygene by fimple earths, and particularly by alumine:* there is, however, this difference, that M. Humboldt regards the phenomena, which he fuppofed to prefent themfelves, as a fimple feparation and fixation of the oxygen, the azote remaining behind in the gafeous ftate: "but," fays M. Girtanner, "the "azote obtained, in thofe cafes, being always a "product of the operation, and not exifting, in the "form of azote, in the air fubmitted to examination,

* Vide Medical and Chirurgical Review, vol. 6, page 457.

"previous

" previous to the experiment, M. Humboldt, *who* " *loves to draw general conclusions from isolated* " *facts*, appears to deceive himself when he advances, " that the earths might be employed for determining " the quantity of azote contained in atmospheric " air: the earths do not indicate the azote contained " in atmospheric air: they change this air into " azote."

M. *Saussure*, jun. has formally contradicted the result announced by Humboldt. He allows, that common earth (vegetable mould), which is the result of a mixture of decomposed vegetables with others, not in a state of decomposition, absorbs oxygen gas; and this, indeed, is generally known: but he asserts, that this does not take place when the earths are pure, and deprived of all vegetable matter. And he describes a number of experiments which he made with alumine, calcareous earth, and silex, in proof of this point.

M. *Humboldt*, in the *Journal de Physique*, replies to those objections, quite in a magisterial tone. His answer contains a renewal of his former assertions, with a sort of guarantee of the truth of them, from his having made his observations in the laboratories of *Vauquelin* and *Fourcroy*. Doubtless, remarks M. Berthollet, this authority would have great weight, had those celebrated chemists themselves co-operated in the experiments; but so far from this is it, that it is remarkable, the only experiments which were made in their presence did not succeed.

M. *Fabroni*, of Florence, repeated the experiments of M. Humboldt without success. M. *Champy*, jun. an accurate observer, repeated them at *Cairo*, with *alumine*, with *lime*, and with the *mud* of the *Nile*, without any absorption taking place. M. *Chaptal*, likewise, failed in the same object, in his experiments made at *Montpelier*. And, lastly, M. Berthollet kept moistened *alumine* in contact with both atmospheric air and oxygen gas for a considerable length of time,

aided

aided by long-continued agitation; but without obſerving the ſmalleſt degree of abſorption to have taken place.

Since the above obſervations were written, the death of M. *Girtanner* has been announced. He died at the age of forty, at Gottingen, of a fit of apoplexy. M. Girtanner was highly diſtinguiſhed throughout Germany, by his literary talents, and was author of ſeveral works on Medicine and Natural Hiſtory. He was the firſt chemiſt of that nation that adopted and diſſeminated the new doctrine and nomenclature of the French chemiſts. He was a man of a brilliant genius, but haſty in his adoption of facts, and in his application of them: prone to frame ſyſtems, on narrow views and apparent analogies, he readily deluded himſelf with the vain expectation of rapidly advancing the progreſs of ſcience. Experiment itſelf became, in his hands, the ſource of error and miſconception: of this, a ſufficient ſpecimen is afforded in the memoir alluded to above.

ART. XXVI. *Recherches Anatomiques ſur la Poſition des Glandes, et ſur leur Action:* i. e. *Anatomical Reſearches reſpecting the Poſition of the Glands, and their Action. By* THEOPH. BORDEU. Twelves, above 500 pages, price 2. fr. 50. c. Paris, 1800.

THIS is a new edition of the work of M. *Bordeu*, on the glands of the human body; a ſubject that has been ſeldom profeſſedly and ſeparately treated of. The preſent edition is accompanied with the editor's notes and reflections on different paſſages.

ART.

Art. XXVII. *Analyſe Comparée des os de l'Homme avec ceux de differens Animals:* i. e. *Comparative Analyſis of the Bones of the Human Species, and thoſe of Animals. By Cit.* Merat-Guillot, *Apothecary, at Auxerre.* *Ann. de Chym. No.* 100.

OUR laſt Number contained an account of the experiments of Mr. *Hatchett*, on the earthy part of bones, and of teſtaceous ſubſtances in general. We there ſaw, that, in bones, as well as in certain ſhells, the earthy part conſiſts almoſt wholly of phoſphate of lime, cemented by more or leſs of membranous ſubſtance, or animal gluten. The deſign of M. *Merat-Guillot*, in the work before us, was to examine and compare together the compoſition of bone, not only in different animals, but in the ſame animal, at different ages. The want of opportunity, however, of procuring all the neceſſary ſubjects for compariſon, prevented the completion of his plan. The work is eſpecially deficient, in not noticing the bones of carnivorous animals, nor the ſkeletons of inſects. But this deficiency the author hopes to be able to ſupply at ſome future period.

The author was deſirous of comprehending, in his work, the hair and horny matter of different animals. With reſpect to the former, he obſerved, that, in treating it with cauſtic ſoda, by the aid of heat, a conſiderable diſengagement of ammoniac took place. On dropping into the ſolution muriatic acid, ſulphurated hydrogen gas was given out, and a ſmall dark-coloured precipitation took place. From this, and from the ſolution blackening ſilver immerſed in it, the author concludes, that hair contains a portion of ſulphur in its compoſition.

The following table contains the reſult of the experiments made with the different ſubſtances there mentioned. The proportions ſtated refer to 100 parts, the quantity operated on.

Subſtances

Substances employed.	*Propor. of gluten.*	*Calcar. phosphate*	*Carbonate of lime.*	*Loss.*
Human bone taken from a burial ground	16,	67,	1,5	15,5
Ditto, dry, but which had not been buried in the earth	23,	63,	2,	2,
Bone of an ox	3,	93,	2,	2,
.... of a calf	25,	54,	a slight trace.	21,
.... of a horse	9,	67,5	1,25	22,25
Teeth of a horse	12,	85,5	0,25	2,25
.... of an elephant (ivory)	24,	64,	0,1	11,15
Bone of a sheep	16,	70,	0,5	13,5
.... of an elk	1,5	90,	1,	7,5
Horn of a stag	27,	57,5	1,	14,5
Bone of a hog	17,	52,	1,	30,
.... of a hare	9,	85,	1,	5,
.... of a fowl	6,	72,	1,5	20,5
Egg-shell	3,	2,	72,	23,
Bone of the pike	12,	64,	1,	23,
.... of the carp	6,	45,	0,5	48,5
.... of the viper	21,5	60,5	0,5	17,5
.... of the lobster	18,	14,	40,	28,
Mother of pearl	2,5	0,	66,	31,5
Crabs eyes (pierres d'ecrevisse)	2,	12,	60,	26,
White coral	1,5	0,	50,	48,5
Red ditto	0,5	0,	53,5	46,
Jointed coralline	7,5	0,	49,	43,5
Cuttle fish bone	8,	0,	68,	24,

The loſs obſerved in the various experiments is referred partly to water, which ſtill adheres, in ſome degree, to the gelatinous ſubſtance, however well dried; to a portion of the gluten being diſſolved and carried off in the liquid employed in the analyſis; and to a ſmall quantity of ſaline matter, the nature of which was not examined.

ART.

Art. XXVIII. *Verſuch einer Chronologiſchen, &c.* i. e. *An Attempt to exhibit the Literary Hiſtory of Medical Science, in Chronological Order, with the View of facilitating and promoting its Study. By* Dr. J. G. Knebel. Octavo, 411 pages. 1799. Breſlau.

THE author has divided his work into four periods: the firſt extending from the origin of medicine to the time of *Hippocrates;* the ſecond from thence to the death of *Galen;* the third to the time of *Paracelſus;* and the laſt to the year 1797. Though the hiſtory is thus brought down to ſo late a period, the author, for very good reaſons, has not thought it proper to include living characters.

Art. XXIX. *Inſtruction ſur la Pratique de l'Inoculation de la Petite Verole, &c.* i. e. *Inſtructions for the Practice of Inoculation of the Small Pox, followed by a compendious View of the Nature and Treatment of this Diſeaſe; extracted from the Lectures of Cit.* Portal, *Profeſſor of Medicine at the College of France. By* C. Salmade, *M. D.* Octavo, 296 pages. Paris, 1799.

INOCULATION has fewer advocates in France than in this country: hence the ravages of the natural ſmall-pox have been uncommonly great. This has been peculiarly the caſe, of late, in Paris, and the practitioners of that city have taken great pains to do away the prejudices, which ſtill exiſt againſt the practice of inoculation. The preſent treatiſe, therefore, is likely to be received in France with ſome degree of intereſt.

The two firſt chapters treat of the origin and advantages of inoculation. The author ſhews the little

 comparative

comparative danger of the practice, the advantages of which have never failed to manifeſt themſelves whereever it has been introduced. The third chapter treats of the circumſtances which ſhould precede inoculation; the choice of age, of ſeaſon, the previous preparation, and uſe of remedies. In the 4th and 5th, the means requiſite to inſure ſucceſs are pointed out, together with the precautions which experience has ſhewn to be neceſſary.

A compariſon is next made between the different modes of performing the operation, and the advantages and diſadvantages of each. The general treatment proper to be followed is ſhewn, both when the ſymptoms go on regularly and mildly, and when accidents and irregularities ariſe during their courſe.

ART. XXX. *De l'Influence des Paſſions de l'ame dans les Maladies, et des Moyens d'en corriger les Effets, &c.* i. e. *On the Influence of the Paſſions on Diſeaſes, and on the Means of correcting their Effects. By* C. J. TISSOT, *M.D.* Paris, 1799.

THE name of M. *Tiſſot* will, doubtleſs, give a currency to this, as it has done to his other works. Of the merits of the preſent eſſay we know nothing. From the *Magazin Encyclopedique* we learn, that it is divided into three ſections; the firſt treating of the paſſions which characterize the different temperaments. In the ſecond part, the author points out the effects of the paſſions, with regard to particular diſeaſes. The means of obviating the ill conſequences which thence reſult, form the ſubject of the concluding ſection.

ART.

Art. XXXI. *Essai sur les Combustions Humaines, produits par un long Abus des Liqueurs Spiritueuses:* i. e. *An Essay on the Combustion of the Human Body, from the long Abuse of Spirituous Liquors. By* Pierre-Aimé Lair. Twelves, 100 pages. Paris, 1800.

THE subject of the essay here announced is altogether so surprizing, and so difficult of solution, that it has probably obtained but a very small degree of general credit. There are, however, so many instances of the kind on record, attested too in the strongest manner, that we are almost compelled to admit their truth. The author cites a number of examples, from various sources, of animal combustion, as taking place in the human body; and he endeavours to furnish us with some explanation of the fact.

He observes, 1st. That persons who have undergone this process, had been long addicted to the use of spirituous liquors; whence the substance of the whole body became at length penetrated by the alkoholic particles. 2. Combustion has only been observed to take place in the bodies of women. This he accounts for, from the softer and more spongy state of their bodies; thus more readily imbibing the inflammable matter. 3. It has only occurred in old women; the reason is, that there are few others that give themselves up to this kind of excess, and at the same time so much abound in fat, owing to their sedentary mode of life. 4. The combustion in these cases has been produced by accident, and has not begun spontaneously; thus it has always been found to take place near a fire, or where a candle or lamp was at hand; so we observe the vapour of heated spirits of wine take fire at some distance from the flame of a candle. 5. The extremities have generally escaped combustion; as being of a firmer consistence than the fat and fleshy parts of the trunk. 6. Sometimes water,

 instead

inſtead of extinguſhing the flame, has only ſerved to render it more active; as takes place, often, when water is thrown on burning oil, and the like. 7. The fire thus excited has ſeldom ſpread, in theſe caſes, to the ſurrounding combuſtible matter; becauſe the flame which iſſues from the animal body in a ſtate of combuſtion is of a peculiar nature; not unlike *pyrophorus*, which burns ſlowly, and with little activity. 8. Laſtly, the combuſtion of theſe bodies has always left a reſidue of oily, fœtid aſhes; pointing out the animal nature of the proceſs.

Such is the train of argument employed in this little work. If the reader is deſirous of recurring to inſtances of the ſort, we refer him to Mr. Wilmer's caſes in Surgery, where he will find an account of a woman whoſe body was found reduced to aſhes in this manner; together with a reference to other inſtances of the like kind.

ART. XXXII. *Leçons d'Anatomie Comparée, &c.* i. e. *Lectures on Comparative Anatomy. By* G. CUVIER, *Member of the National Inſtitute, &c. collected and publiſhed under his Inſpection, by* C. DUMERIL, *Teacher of Anatomy in l'Ecole de Medecine de Paris.* Vol. I. *Containing the Organs of Motion:* Vol. II. *The Organs of Senſation.* Octavo, about 700 pages each, price 10 francs.

THE work here announced, and which is held in high eſtimation, treats, in ſucceſſion, of the bones and muſcles which compoſe each part of the body; of the brain, the nerves, and the organs of ſenſe, as they appear in man, and in the different claſſes of animals. In the lecture, for example, which has the eye for its ſubject, the author firſt treats ſeparately of the membranes, the humours, the nerves, and the muſcles of the eye and eyelids, of the glands, &c.

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He deſcribes the ſtructure of each of theſe generally, and the modifications they undergo in the different claſſes, and alſo in the different genera: thence he deduces the general uſes of the parts, and their particular uſes in the various tribes.

Each lecture is preceded by a phyſiological view of the part which is the ſubject of it: the whole conſiſts in general conſiderations on the animal economy, and its laws. The firſt volume is terminated by ſynoptical tables of the claſſes of animals, wherein the genera are arranged in a method peculiar to the author.

Art. XXXIII. *Principles of Modern Chemiſtry, ſyſtematically arranged. By Dr.* C. F. Gren, *late Profeſſor at Halle, in Saxony. Tranſlated from the German.* Octavo, 2 vols. 946 pages, with plates and tables, price 18s. London, 1800. Cadell and Davies.

SO rapid has been the progreſs of Chemical Science of late years, and ſo numerous and important are the facts which daily preſent themſelves to the view of aſſiduous inquirers, that a frequent aſſemblage and compariſon of them becomes requiſite, for the eſtabliſhment of new principles and new ſyſtems. The preſent work has great merit, in this point of view, as exhibiting a clear and connected account of the preſent ſtate of the ſcience of Chemiſtry, intermixed with the author's reflections on ſome generally received opinions, from which he has thought proper to diſſent. His metaphyſics, as is not unfrequently the caſe, ſoar, at times, beyond the reach of common ſenſe. Thus, when he teaches, ' that matter fills all ſpace, without any intervening vacuity,' and immediately after obſerves, ' that it is, nevertheleſs, poſſible for two particles of matter to exiſt together in the ſame ſpace, at the

the ſame time:' 'that caloric is elaſtic and expanſible, and that it fills all ſpace, in continuity, without interſtices;' we encounter a doctrine, which it requires a new ſenſe to comprehend the poſſibility of.

The general contents of the volumes will appear from the following abſtract:

A ſketch of the hiſtory of Chemiſtry prefaces the work. In the *firſt* chapter are explained thoſe more general laws which reſpect, alike, every part of chemical ſcience; the general nature of the moſt remarkable proceſſes of the laboratory, and the forms and peculiar uſes of thoſe inſtruments which chemiſtry chiefly employs. The chemical hiſtory of the more remarkable gaſes, and of ſome of their proximate compounds, fills the *ſecond* chapter. The general characters of the acids, of the alkalies, and of their neutral compounds, are exhibited in the *third*. The *fourth* traces the hiſtory of the earths. In the *fifth* the properties of the mineral acids are explained with conſiderable minuteneſs of detail. The chemical compoſition of vegetables, their principles, immediate and ultimate, with their uſes in the arts, are the ſubject of the *ſixth* chapter. The *ſeventh* chapter is employed upon animal matters. Fermentation and putrefaction are the ſubjects of the *eighth*. The *ninth* and *tenth* chapters give the chemical hiſtory of bituminous and carbonaceous minerals. The metals are the ſubject of the *eleventh*. Tables of attractions, ſpecific gravities, weights, meaſures, &c. fill nine articles of an appendix. A copious index concludes the laſt volume. A preface, by the tranſlator, and a table of contents, are prefixed at the beginning of the firſt.

ART.

Art. XXXIV. *The moſt cogent Reaſons why aſtringent Injections, cauſtic Bougies, and violent Salivations, ſhould be baniſhed for ever from Practice; with the mildeſt Methods of ſafely treating every Species of Venereal Infection, Strictures of the Urethra, &c. and correcting Miſchiefs ariſing from Cauſtic Bougies. By* William Rowley, *M.D. Phyſician to the Mary-le-Bone Infirmary, &c. &c.* Octavo, 173 pages, price 4s. London, 1800. Murray and Highley.

THE extraordinary work before us commences with a ſhort hiſtory of the venereal diſeaſe, followed by a deſcription of its leading ſymptoms. In reſpect to the properties of the venereal virus, the author obſerves, ‘ that the poiſonous particles are different from all other contagion, and the *affection* is *miaſma ſui generis*. It is extremely ſubtle and penetrating, for it enters the minuteſt pores of our body; and, from contact, is conveyed by the lymphatics into the habit. It is acrid and irritating, and has an affinity with oleous and mucous fluids; *from hence it affects*, particularly, the muciparous and lymphatic glands. It is neither determined to be acid, alkaline, putrid, nor ſaline. In the night it (*qu.* the poiſon?) rages moſt, and cannot be deſtroyed by any other means than mercury, &c.’ ‘ Millions of experiments,’ it is further obſerved, ‘ prove that mercury is the *only*, the *beſt*, and *ſafeſt*, antidote for venereal infection.’

Although, in his title-page, the author baniſhes *for ever*, from practice, violent ſalivations; yet he obſerves, p. 8. ‘ *ſtrong fluxing ſalivations* I have *always* thought unneceſſary, *except* in very ſtrong robuſt habits, not eaſily moved.’ He aims at ‘ the extinction of the diſeaſe by light frictions, and by giving, internally, very ſmall doſes of mercurials, at proper diſtances, *with or without antimonials*.’ ‘ It is the art

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of giving mercurials as *alteratives*, not as *evacuants*,'—he had before obferved, 'that the cure requires the *removal* of the venereal poifon.'

In the treatment of gonorrhoea, although aftringent injections are exclaimed againft, mercurial mucilaginous ones are advifed: 'by thefe, *if fkilfully applied*, the cure is often accomplifhed in a few days, with very little medicine; but, after that early period, all injections may be hazardous.' 'If the difeafe fhould have been neglected, on its firft appearance, a *judicious treatment* of membranous and mucal glandular inflammation, arifing from venereal poifon, fhould be adopted; for on *this laft idea* depends the fafeft cure and future fecurity of the patient.' The means recommended for fulfilling thefe indications are, '*depleting* the veffels,' '*peniluvia*,' '*hydrargyric* pills,' '*pilulæ mitiores, fortiores, fortiffimæ*,' '*cinnabarine* fumigations,' 'injections of hydrargyrus muriatus, diffolved in *aqua*,' &c. &c. according to particular circumftances.

Upon the whole, the author's arguments are likely to meet a better reception from the *contaminated part* of the public, than from profeffional readers, for whofe ufe they were, it may be, not intended.

MISCEL-

MISCELLANEOUS.

A PAPER has been lately circulated, having the ſignatures of a conſiderable number of profeſſional men of the firſt character in London, in favour of the Cow-pox; ſtating their conviction of its comparative mildneſs, and of its certainly-preventive power with regard to Small-pox. Its object is to leſſen the prejudices ſtill entertained by the public againſt the new inoculation, and which ſome perſons have taken no ſmall pains to foſter.

We are now to ſtate a fact reſpecting the vaccine inoculation, which, as far as it goes, we believe to be perfectly well-founded, and which, probably, will be eagerly caught at by the opponents of the new practice: it is as follows.

Mr. *Malim*, Surgeon, of Carey Street, London, inoculated a child, two years and a half old, with vaccine matter procured from Dr. Jenner. On the third day there were ſufficient marks of the action of the virus, and from this time, to the end of the diſeaſe, the local affection proceeded regularly, and without interruption. On the eighth day the child complained of head-ache and ſickneſs; had a quick pulſe, white tongue, and increaſed heat, with an enlargement and tenderneſs in the axilla. Theſe ſymptoms ſubſided in the courſe of the next day, and the child remained well till the twelfth, when it had a very ſevere attack of fever, ſucceeded the following day by an eruption, the appearance, progreſs, and termination of which left no doubt in the minds of ſeveral eminent practitioners of its being the ſmall-pox. That it was really ſo has been ſince clearly proved, by the matter of the puſtules having produced ſmall-pox by inoculation.—There was a child ill of ſmall-pox in the houſe, at the time

time the above inoculation for cow-pox was performed.

The caſe above deſcribed ſeems to prove one of two things: either that cow-pox is not, *without exception*, a preventative of ſmall-pox; or that the local affection which ſucceeded the vaccine inoculation was not the genuine cow-pox puſtule, but one of thoſe ſpurious ſorts which have been frequently mentioned, and which have no power of deſtroying the variolous ſuſceptibility. In the preſent caſe this is hard to believe, when the ſource of the matter is conſidered, together with the ſubſequent appearances excited by it. The hiſtory, however, is defective, in not deſcribing more minutely the appearances of the inoculated part in the different ſtages, as the employment of general terms always gives room for cavil and diſpute. The length of time that the matter had been taken previous to being uſed, ſhould alſo have been mentioned.

M. *Prouſt* points out an eaſy method of obtaining the tanning principle *(le Tannin)* in a pure ſtate. It conſiſts in adding to an infuſion of galls a ſolution of the carbonate of potaſs. By the mixture of thoſe two liquors a yellowiſh-white precipitate is formed, like ſcales, which is to be waſhed in a ſmall quantity of cold water. Care muſt be taken to avoid uſing much water, as this ſubſtance is entirely ſoluble both in warm water and in a large quantity of cold. It is, likewiſe, eſſential, that the alkali be fully ſaturated with carbonic acid; for in its cauſtic ſtate it readily diſſolves the tanning matter. It would ſeem, that the carbonate of potaſs only acts by attracting to itſelf the water of ſolution; for all the ſalts which, in the cold, have a certain degree of affinity for this fluid, produce a ſimilar effect.

It is not improbable, M. *Prouſt* obſerves, that the ſolution of the tanning principle might ſerve the purpoſe

poſe of embalming better than any ſubſtance that has been hitherto employed.

M. *Humboldt*, in a letter to M. Fourcroy, dated from *Guaira*, in South America, whither he has of late been travelling for ſcientific purpoſes, makes ſome remarks on the air contained in the ſtems and capſules of different plants. M. *Coulomb* had before noticed air ruſhing with a ſort of exploſion from the trunks of trees, when pierced. M. Humboldt made ſome experiments of this kind on the *cluſea roſea*, in the interior veſſels of which (the *vaſa cochleata* of *Malpighi)* circulates an immenſe quantity of air.—This air was found to contain as much as $\frac{35}{100}$ of oxygen. The leaves of the ſame plant, expoſed to the ſun under water, gave out but a very ſmall portion of pure air. The air which thus circulates, ſerves, as in the animal body, for the coagulation of the fibrous part, in conſequence of the oxygen being abſorbed.

Although the purity of the atmoſphere in South America riſes, eſpecially during the night, to above 30 parts in the 100,* yet M. *Humboldt* found, he ſays, the air contained in the ſiliques and capſules of equinoctial plants, as the *paullinia*, to contain a larger proportion of azote than the atmoſphere of France, the oxygen not exceeding 24 or 25 parts in 100. The air in the *culmi geniculati* was found to contain only 15 of oxygen. Theſe facts prove, that the air which is in a ſtate of circulation in plants is more pure, whilſt that which is depoſited, and at reſt in their capſules, or *utriculi*, is leſs ſo, than the atmoſpheric air. The firſt has been recently produced by the organs ſerving for the decompoſition of water, and ſerves, by the abundance of its oxygen, to precipitate

* *See* ſome remarks on the purity of the atmoſphere in different places and ſituations, in our laſt Number, page 89; where M. *Berthollet* ſhews, that M. *Humboldt* and others have rated the proportion of oxygen in the atmoſphere much too high, owing to the imperfection of eudiometrical experiments.

pitate the fibrous matter, for the formation of the cellular tiſſue: the latter is the reſidue of a gas, which has already performed theſe functions.

The imperfection of all the hygrometers, or inſtruments for meaſuring the degree of moiſture in the atmoſphere, hitherto in general uſe, has been univerſally felt and complained of. Mr. *John Leſlie*, an ingenious Engliſhman reſident at Hamburgh, has invented an inſtrument, whoſe ſimplicity of conſtruction and facility of application render its diſcovery of great importance in philoſophical inquiries. It is well known that evaporation occaſions cold; and Mr. Leſlie has taken advantage of this circumſtance in the conſtruction of his hygrometer. The degree of cold produced by the evaporation of any fluid, and which may be calculated from the contraction which the fluid has undergone, ſerves to ſhew the dryneſs of the air, or, in other words, the facility and readineſs with which it takes up and diſſolves any fluid. The inſtrument here recommended conſiſts of two hollow glaſs bulbs, communicating with each other by a narrow tube, containing a coloured liquid, and bent, near its middle, ſo as for the two arms of the inſtrument to be placed parallel to each other, at little more than a quarter of an inch diſtant. The coloured liquor occupies about $\frac{8}{10}$ of the cavity of the tube, the remainder of which, together with the bulbs (the inſtrument being ſupported vertically with the bulbs upwards), is filled with hydrogen gas. If, now, one of the bulbs be moiſtened with water, the diminution of bulk in the air contained in that ſide, with the expanſion of the air in the oppoſite, and the conſequent deſcent of the coloured fluid, marks the degree of cold produced, and, of courſe, the degree and rapidity of the evaporation, that is, the dryneſs of the external air, or its diſpoſition to unite with water. A proper graduated ſcale is applied to the tubes.

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The ſame inſtrument is contrived by Mr. *Leſlie* to anſwer the purpoſe of a *photometer*, or inſtrument for meaſuring the degree of light. In this caſe, one of the bulbs is conſtructed of black glaſs, or blackened by ſome proper coating; whilſt the other is rendered as tranſparent as poſſible. The former abſorbs the light which falls on its ſurface; the latter tranſmits it freely. Light produces heat in proportion to its abſorption; whether by uniting with the body, and conſtituting the actual matter of heat, or by merely exciting heat in the act of combination, is diſputed. The ſinking of the coloured liquid in the tube marks the degree of heat produced, and, of courſe, the quantity of light abſorbed and acting on the bulb.

This inſtrument, which Mr. Leſlie found to mark, with preciſion, not only the influence of the direct ſolar rays, but thoſe reflected from the heavens likewiſe, is ſenſible to every change in the atmoſphere. It marks the progreſs and decline of day, as well as the periodical augmentation and diminution of light in the different ſeaſons of the year. It is capable, he obſerves, of ſerving various other uſeful purpoſes; ſuch as determining the relative properties of divers coloured ſubſtances, in reflecting, abſorbing, or tranſmitting light. By it, alſo, may be diſcovered the power of different fluids for conducting heat. A number of experiments of this ſort have been made by the ingenious author, the reſult of which he promiſes ſoon to lay before the public.

From ſome experiments to determine the influence of different kinds of air on the germination of ſeeds, made by Prince *Gallitzin*, as related in the ſittings of the Electoral Academy of Sciences at *Erfurt*, it appears, that the ſeeds of garden-creſſes germinated in oxygen gas, and in air corrupted by reſpiration and combuſtion, as well as in common air. Carbonic acid and hydrogen gaſes checked and retarded germination, without totally preventing it. Nitrous air

deſtroy-

destroyed the seeds entirely, rendering them black, and incapable of germinating in other kinds of air. Dr. *Thilow* found, that a mixture of oil of vitriol and water, sprinkled on a sickly dwarf-tree, destroyed the tree-lice which had injured it, and the tree afterwards throve well. The growth of an auricula was, by the same means, considerably promoted.

Locke and *Condillac* supposed, that all our ideas were the result of impressions made on the external senses; denying altogether the existence of innate ideas. M. *Cabanis*, Member of the French National Institute, in a series of memoirs relative to this subject, read at the sittings of the Society, suggests several new sources of our ideas. M. *Cabanis*, adding to his general philosophic acquirements the knowledge of the animal economy, an advantage not possessed by the writers above named, has discovered in the internal impressions, which are the necessary consequence of the action of the sensitive principle, and of the exercise even of life itself, the cause of those determinations, anterior to all experience and to all acquired ideas, which compose the faculty we term instinct. In the nature and the developement of the faculties which distinguish the different ages; in the constitution and the functions peculiar to each sex; in the physical disposition and habits which constitute and characterize the various temperaments; he sees new springs of the sensations, ideas, affections, and desires, which form principally the variegated picture of living Nature.

The physical knowledge of man, according to M. Cabanis, is the common base of all science relating to him. He shews, that those who have most successfully cultivated rational philosophy were more or less versed in physiology; such were *Pythagoras*, *Democritus*, *Hippocrates*, and *Aristotle*, amongst the antients. These philosophers all laboured to acquire a knowledge of man in his various conditions. They all

all of them ſought, in the ſtudy of the laws of the animal economy, and of the objects capable of acting on and modifying it, the notions neceſſary for extending and perfecting the human faculties. Amongſt the moderns, *Bacon* ſeems to have felt, the firſt, the neceſſity of ſtudying animal phyſics. He intereſted himſelf greatly in every thing that he found to exert any powerful influence over the phyſical and moral conſtitution of man. It was the ſame with *Des Cartes*, who ſought the ſprings of thought, and the ſource of the paſſions, in our phyſical organization. *Locke** finds the ſource of our ideas in our ſenſations. *Bonnet*, though not always happy in the application of his anatomical knowledge to the operations of the mind, at leaſt pointed out the neceſſary connexion which takes place between the phyſical condition of the organs and our manner of feeling and thinking. *Helvetius* and *Condillac* would have ſtill more firmly eſtabliſhed their theories, had they poſſeſſed a more intimate acquaintance with the animal economy.

Senſation, or the faculty of feeling, brings us acquainted with external objects, and with our own exiſtence; but theſe impreſſions may be modified by the primitive organization of individuals, by the circumſtances of age and ſex, by climate, by regimen, as well as by the nature and order of our habits and employments. M. Cabanis proves, in oppoſition to the generality of analyſts of the human underſtanding, that our ideas and moral determinations do not excluſively derive their origin from external impreſſions, but that the internal impreſſions furniſhed by the action of the different organs, contribute, likewiſe, to their formation. Who is there that does not know how much diſeaſes may invert the common order of our ideas and ſentiments, giving riſe to ſtrange and irregular appetites and deſires; that the mind gives itſelf up to

* *Locke* for ſome time ſtudied medicine at Oxford, and, we believe, took a Bachelor's degree in that ſcience.

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agreeable or gloomy images, according to the internal ſtate of the machine? A hundred other proofs might be brought of the intimate and indeſtructible connexion that ſubſiſts between the phyſical and moral conditions of man.

From the attributes which characterize the organization of infants, the author deduces, with no leſs facility than judgment, that tumultuous activity, and that exceſſive mobility, which render this age the ſport of every impreſſion that aſſails it. He ſhews this activity and mobility diminiſhing, in proportion as the organs acquire firmneſs and conſiſtency, and giving place to movements of a firmer kind. A double gradation of phyſical and of moral changes conducts the infant through youth to maturity, when the fulneſs of life manifeſts itſelf, by the force and ſuppleneſs of the organs, by the ready circulation of the fluids, and by a vehemence in all the actions, which never fails to accompany the conſciouſneſs of power poſſeſſed. An interval, too ſhort, alas! preſents itſelf, between this brilliant epoch, and that where the languor of the circulation, and a general diminution of energy in the organs, announce man in the wane of life. This degradation increaſing more and more, the principle itſelf of action becomes at length impaired, whilſt the inſtruments become, in proportion, leſs capable of obeying its impulſe. The operations of the intellect are daily performed with more tardineſs and heſitation: the character becomes more and more timid, diſtruſtful, and averſe to every active enterprize. The difficulty of exiſtence augmenting in continual progreſſion, the feelings are no longer directed abroad. A fatal neceſſity continually reflects the old man on himſelf: his egotiſm is the immediate effect of Nature. At length, finding nothing but reſiſtance on all ſides, the difficulty with which he exiſts renders welcome and deſirable the peaceful ſlumbers of the grave.

The examination of the phyſical and moral conſtitution of the ſexes gives a further ſupport to the opi-

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nions of M. Cabanis, and the consideration of *temperaments* confirms them. The antients noticed four different temperaments, the shades and intermixture of which are infinitely diversified. The author adds two others,—the one characterized by the predominant action of the nervous system; the other of the muscular. From all those varieties of organization proceed moral habits and propensities, which vary as the physical causes which determine them.

Cit. *Chaussier* communicated lately to the *French National Institute* a method of preserving the parts of animal bodies, in their perfect form, which merits notice. It consists in immersing them for some time in a solution of oxygenated muriate of quicksilver *(corrosive sublimate)*. On taking them out of this liquid, and suffering them to dry, they are found to acquire the hardness of wood, and are perfectly unchangeable in the air. If the bodies intended for this purpose are previously injected, they retain even the colour and freshness of life, and thus form a kind of mummies, infinitely more perfect than those of Egypt, which, as has been justly said, only serve to perpetuate the image of death. M. Chaussier entertains no doubt that the method here recommended is that which was employed by *Ruysch,* and which anatomists have in vain endeavoured to discover.

M. *Guyton-Morveau* read lately, in the *French National Institute,* a memoir on the constituent parts of fixed alkalies, the result of experiments made by himself and M. *Desormes.* Their conclusion was, 1st. that *potash* is composed of lime and hydrogen: 2d. that *soda* is composed of magnesia and hydrogen. From other experiments they conclude, that *lime* is composed of carbon, azot, and hydrogen; and that *magnesia* is composed of lime and azot, and consequently of carbon, hydrogen, and azot.

Dr. *Vincent Mijaiſta*, of Madrid, Phyſician to the Royal Family of Spain, it is ſaid, intends to publiſh, in the Spaniſh language, all the favourable opinions and adverſe arguments, candid and impartial critiques, in ſhort, all the remarks and obſervations of any value, which have appeared in print in Europe, relative to the Medical Syſtem of the late Dr. John Brown. The firſt volume, entitled—"A Key to Brown's Medical Syſtem," will contain a full explanation of the theoretical part of the ſyſtem; the ſecond volume, under the title of—"Diviſion of the different Diſeaſes, according to the Principles of Brown's Syſtem, or *Noſologia Browniana*," is to comprize an introductory diſcourſe on noſology in general, with two large tables, repreſenting the claſſification of all univerſal diſeaſes, their cauſes, prediſpoſitions, and the degrees of ſtimulation and irritation from whence they proceed. The third volume will contain a Series of Practical Obſervations, and Caſes of Diſeaſe, treated according to the Principles and Rules laid down by Dr. Brown.

(*Madrid Gazette.*)

Dr. Hipolito Ruiz, of Madrid, the celebrated author of the "*Quinologia*, or Deſcription of the different Species of *Cinchona*, hitherto diſcovered in Peru," and editor of the "*Flora Peruviana et Chilenſis*," having found, by repeated experiments, that the extract of the root of a South American plant, named *Ratanhia*, is an infallible ſpecific againſt hæmorrhagy, has lately publiſhed an accurate deſcription of that plant, illuſtrated by a plate, together with a circumſtantial account of a great variety of caſes, in which he has adminiſtered the extract with the moſt complete ſucceſs. (*Ibid.*)

Dr. *Ignacio Laraba*, and Dr. *Iſidero de Iſaura*, of Madrid, have lately publiſhed the firſt part of a very valuable anatomical work, undertaken by command of His Catholic Majeſty, and printed at his expence.

It

It contains nine excellent plates, accurately repreſenting, the firſt, the ſtructure of bone in general; and the others, the bones of the head in particular. Each plate is accompanied with a methodical expoſition of the uſes of the different parts delineated in the plates, and their mutual connexion with each other.

(Memorial Literario.)

Dr. *Juan Naval*, Phyſician to the Royal Family of Spain, who, in the courſe of the laſt year, publiſhed an excellent Treatiſe on the "Diſeaſes of the Organ of Hearing," has lately added to his literary fame, by a valuable work on the "Diſeaſes of the Urinary Paſſages," and which has experienced the moſt favourable reception from the faculty. *(Madrid Gazette.)*

Dr. *Antonio Fernandez*, whoſe method of diſſolving camphor in water we alluded to in our laſt Number (p. 100), has publiſhed, in the *Madrid Gazette*, a further and more particular account of his diſcovery. It conſiſts in impregnating the water with carbonic acid: every ounce of water is thus made to contain half a grain of camphor in perfect ſolution. The weight of the water thus impregnated differs very little from that of diſtilled water. The quantity in which this camphorated water has been exhibited, both by Dr. Fernandez and other phyſicians, varied according to circumſtances, and the ſymptoms of the different caſes which occurred. In hyſterical and hypochondriacal diſorders, where the ſolution has always produced the moſt ſalutary effects, it was adminiſtered in doſes of two or three ounces. In caſes of retention of urine, ſix ounces were taken every two hours, until the obſtruction was overcome; and this point having been attained, the ſame quantity, taken twice or three times a day, produced, it is ſaid, the beſt effects. When the diſtemper merely conſiſts in a burning or painful ſenſation, ſix ounces may be taken, mixed with a ſlight decoction of *althæa officinalis*. As the

above ſolution may be given with ſucceſs in a great variety of caſes, it ſhould be preſerved with the utmoſt care, and in veſſels kept cloſed, with all the precaution which gaſeous waters in general require. When it is wiſhed to weaken it, or deprive it of the carbonic acid, for the purpoſe of injection into the urethra (ſince it operates here as a ſtimulant), the veſſel ſhould be ſhaken for ſome time; the air will thus be diſengaged, and the ſolution can be employed without that inconvenience, which its uſe might otherwiſe be attended with. The ſame method ſhould be obſerved in all caſes where the above acid is contra-indicated.

M. *Jürine* read lately, to the Philomathic Society of Paris, a memoir on the inſect *monoculus*, which ſhews, that, in theſe inſects at leaſt, the inteſtinal canal poſſeſſes a greater ſhare of irritability than the heart. Having reduced ſeveral of them to a ſtate of *aſphyxia*, by means of a few drops of ſpirit thrown into the water that contained them; and having revived them again by adding more pure water, he obſerved that the inteſtinal canal retained its irritability longer than the heart, and reſumed it ſooner. From analogy, we might conjecture the ſame to be the caſe with other animals.

It appears, from the teſtimony of Dr. *Trotter*, Phyſician to the Fleet, that the concrete acid of lemons, as prepared by Mr. *Coxwell*, Druggiſt, in London, is fully equal in its powers, as an antiſcorbutic, to the recent juice of lemons. It is brought into the concrete form in the manner recommended by *Scheele* (*Crell*'s Journal for 1784), viz. by combining the freſh vegetable acid with lime, and precipitating it again from this by means of the vitriolic acid.

No. XXXIX.

THE MEDICAL AND CHIRURGICAL REVIEW.

NOVEMBER, 1800.

Art. XXXV. *Tranſactions of a Society for the Improvement of Medical and Chirurgical Knowledge.* Vol. II.

(Concluded from page 128.*)*

THE next article we are to notice in this eſtimable collection is the 12th—' On the Uſe of the Application of Gaſtric Juice to Sores:' by Dr. Harneſs, Phyſician to the Fleet. The ſubject of this paper made a part of the ſecond volume of Dr Trotter's *Medicina Nautica*, and was noticed by us at the time*. The author obſerves, that he has found this application ſucceed in more than a hundred caſes of ſphacelus; and its utility has been confirmed by the concurring teſtimony of the Surgeons of the Naval Hoſpital at *Baſtia*.

13. ' The Caſe of a Perſon who was Shot through the Lungs, and ſurvived for 32 Years; with an Account of the Appearance of the Contents of the Thorax

* Med. and Chir. Rev. vol. 6, p. 227.

Thorax after Death:' by Mr. Home. It has been proved by a number of caſes, that wounds made by muſket-balls through the lungs are not neceſſarily fatal. Mr. Hunter imagined that the lungs, in thoſe caſes, always adhered afterwards to the ribs at the wounded part. In the caſe here related, however, this was found not to have taken place. At the part of the lungs where the ball entered, there was the remains of a ſmall cicatrix, having a puckered appearance. The courſe of the ball through the lungs was readily traced by an induration of their ſubſtance. The valves of the heart were found diſeaſed, and the heart itſelf much enlarged. The patient, from the time of his wound, was ever after ſubject to inflammation of the lungs on catching cold.

14 'An Account of the Caſe of a Man who had no Evacuation from the Bowels for nearly fifteen Weeks before his Death:' by Dr. Baillie. This patient had been naturally of a coſtive habit, but had otherwiſe enjoyed good health. For the laſt eight months of his life he had a ſtool only once in a week, or ſometimes once in a fortnight. The diſtention of the bowels at laſt was very great. The ſtrongeſt purgatives were employed without effect. Electrical ſhocks were paſſed through the abdomen; cold water was daſhed upon his feet, and crude quickſilver was ſwallowed, to the amount of three ounces, no part of which paſſed by the anus. All theſe means were productive of no advantage.

On examination of the body after death, the fœces were found principally accumulated at the lower end of the ſigmoid flexure of the colon, the muſcular coat of which was much thickened. At the lower part of the ſigmoid flexure there was a very narrow ſtricture accompanied with an ulcer, which was partly in the ſituation of the ſtricture, and partly in the gut, immediately above it. The ſtricture was ſo narrow as hardly to allow more than a large gooſe quill to paſs through it.

15. 'A Caſe

15. 'A Caſe of Rupture of the Uterus, from which the Woman recovered:' by Mr. *Thomas Haden*, Surgeon at Derby. The rupture of the uterus in this caſe was not aſcertained by examination, but was inferred from the following circumſtances. The woman had been in ſevere labour for twenty hours, during which the child made little progreſs. The os uteri was dilated conſiderably. At this time ſhe was ſeized with an excruciating pain, attended with a loud ſhriek, after which ſhe inſtantly became quite eaſy, and fell aſleep, which ſhe had not done ſince the commencement of labour. In a quarter of an hour ſhe complained of great ſickneſs, and immediately vomited a large quantity of a brown-coloured matter; this was repeated eight or ten times without any return of labour-pains. Her countenance became cadaverous, her pulſe frequent, quick, and ſmall. Conceiving, from theſe ſymptoms, that the uterus was ruptured, the author propoſed delivery by the forceps, which was readily done. The placenta afterwards came away without aſſiſtance. For ſeveral days after delivery ſymptoms of inflamed uterus took place. There was but little lochial diſcharge, and this, after the third day, was more offenſive than uſual.

16. 'Hiſtory of ſome Caſes of Diſeaſe in the Brain, with an Account of the Appearances upon Examination after Death, and ſome general Obſervations on Complaints of the Head:' by Dr. Blane. The firſt caſe here related is one of aneuriſms of the carotid arteries. The ſubject of it was a lady, who, till a few years before her death, enjoyed a good ſtate of health; ſhe had lived full in point of eating, but had been temperate in drinking. At ſixty-four years of age, about five years before her death, ſhe was ſuddenly ſeized with a fit of giddineſs, and dimneſs of ſight, ſucceeded by acute pain in the forehead, which remained for ſome time. The indiſtinctneſs of viſion continued for ſix months. Theſe ſymptoms recurred at intervals as long as ſhe lived. During the laſt

fifteen months of her life ſhe had frequent fits of inſanity, laſting three weeks or a month, in the laſt of which ſhe expired. The chief means uſed for relief were, taking away blood from the head, or near it; purgatives, antimonial medicines, abſtinence from animal food and fermented liquors; from which ſhe ſeemed to derive temporary benefit.

'Upon examining the body,' Dr. Blane obſerves, 'there was no appearance in the brain itſelf that could in any way account for the ſymptoms. There was indeed a greater quantity of fluid than common in the ventricles, and the ſurface of it was moiſter than it is uſually found in a ſound ſtate; but in all other caſes which have occurred to me of organic affections of the brain proving fatal, except thoſe which are ſudden, ſuch as apoplexy, there has been a preternatural quantity of fluid in its ventricles. There were alſo *ſpiculæ* of bone in the membrane, forming the *falx*. The inner ſubſtance of the *crura cerebri* was of a brown colour, and more tender than natural. The optic nerves were ſmaller than natural, as if they had been waſted. The *ſeptum lucidum* was more than uſually denſe.

'But the morbid appearance in this caſe, which was ſo ſingular, and to which the ſymptoms of complaint ſeem chiefly referrible, was two bulbs above five-eighths of an inch in diameter, filling up the hollow on each ſide of the *ſella turcica*, which were evidently dilatations of the carotid arteries; and from their being filled with *laminæ* of coagulated blood, there could be no doubt of their being aneuriſms of theſe arteries. The diſſection was made by Mr. *Hunter*, aſſiſted by Mr. *Home*, in the preſence of Dr. *Jenner* and myſelf, and all concurred in opinion, that theſe tumours were aneuriſms. The one on the left ſide was the largeſt. That on the right ſide communicated with the cavity of the artery, which was not the caſe with the other.

'It is probable that one of the aneuriſms aroſe five years before her death, occaſioning the firſt attack deſcribed,

ſcribed, and that the other aroſe two years afterwards, occaſioning the other attack. It is alſo probable that it was between theſe two attacks that ſhe ſaw objects double, from the unequal compreſſion on the optic nerves. The brain differs from all the other organs of life, in this reſpect,---that it is much affected by partial compreſſion, and compreſſion has a greater effect upon it by its being incloſed in an unyielding bony cavity.

'How far this and the other appearances were connected with the mental derangement, and other ſymptoms, and how far, and in what manner, theſe morbid affections were connected with each other, it is difficult to aſcertain. Whether the yielding of the arteries was owing more to a preternatural weakneſs in their coats, or to a plethora, or to their increaſed action, to one or all of which the hereditary diſpoſition to diſeaſe ſeems referrible, are queſtions which cannot eaſily be decided; but it is an obvious practical ſuggeſtion, that the offspring of this lady ſhould obſerve ſtrict temperance. This precaution was accordingly given, and in conſequence of it, her eldeſt ſon, who had begun to experience fits of giddineſs, has been free from theſe cauſes of alarm ever ſince that time, which is five years, having obſerved during that time a very ſtrict regimen.'

The next is a caſe of tumour found in the ſituation of the pineal gland. The ſubject of it was an officer in the navy, of temperate habits, who, at the age of thirty-three years, began to complain of a ſlight pain, or rather confuſion, in his head, with loſs of appetite, and ſlight thirſt. Theſe ſymptoms continued to recur at times for two or three years, when they became more conſtant and ſevere. At this period the tongue was obſerved to be conſtantly white, and the pulſe was from 80 to 90 ſtrokes in a minute. Theſe ſymptoms continued the ſame during the remainder of his illneſs. He was not very ſenſible to light or noiſe, but extremely ſo to motion, which produced a very un-

eaſy ſenſe of jarring in his head. He uſed frequently to ſay that the pain was in a ſpot in the occiput, to which he put his hand. At other times the pain was diffuſed over the whole head; and he all along complained that it was particularly ſevere on going to ſtool. He had alſo a ſmall degree of numbneſs and weakneſs of the left hand. He was in poſſeſſion of his underſtanding till within three days of his death, when he became delirious, and this was followed by ſtupor.

The only appearances on diſſection which it ſeems material to notice, are that of the lateral ventricles of the brain containing about three ounces of fluid, and a little alſo in the third ventricle. In the ſituation of the pineal gland was a hard firm tumour, of the ſize and ſhape of a nutmeg, about half an inch in diameter: the pineal gland itſelf could not be found. The ſubſtance of the brain in general was rather of a firmer conſiſtence than uſual, but in other reſpects appeared natural and ſound.

Another caſe is curſorily mentioned by Dr. Blane, where there were found a great thickening and hardneſs of the ſkull, with bony protuberances, ſome of which were blunt, and others ſharp, proceeding chiefly from the baſis of it. The moſt remarkable ſymptoms had been temporary failures of memory for ſome months before death, ſudden fits of inſenſibility like apoplexy, and violent convulſions for ſome days before death. There was at intervals an entire freedom from complaint.

It ſometimes happens, the author obſerves, that the brain is in a diſeaſed ſtate, even that of ſuppuration, abſceſs, bloody or ſerous effuſion, without any headache. While, on the other hand, the ordinary headache with which people are affected, ſeems to be ſeated in the integuments of the head; in hemicrania this is certainly the caſe, and he thinks this affection to be induced rather by weakneſs of the veſſels, than by too great action, as it is commonly beſt treated by tonic and ſtimulant remedies.

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One of the moſt common morbid appearances, upon inſpecting caſes of chronic head-ache, is a thickening of the membranes of the brain, owing, probably, to a ſlow inflammation. Mercury, in theſe caſes, the author thinks, is uſeful, by exciting abſorption. The diſtinction of thoſe caſes of head-ache which depend on the ſtomach, from thoſe depending on ſome affection of the part itſelf, is a matter often of no ſmall difficulty, owing to the mutual conſent exiſting between the different parts of the ſyſtem.

17. 'Obſervations on Eryſipelas:' by Dr. *Wells.* The object of the author, in this paper, is to prove that eryſipelas is, ſometimes at leaſt, contagious; and the caſes he has adduced give much weight to the opinion. The fact is important to be aſcertained, with regard to the ſpreading of the diſeaſe. A few remarks on the treatment of eryſipelas are ſubjoined. Moſt writers, he obſerves, conſider it as connected with an inflammatory ſtate of the ſyſtem, and they have attributed the delirium and coma, which occur in dangerous ſtates of it, to inflammation of the brain or its membranes. But this idea is not ſupported by diſſections; as evinced by the examination of a caſe of this ſort by Dr. Baillie, and another by the author himſelf. The Peruvian bark, freely exhibited, a practice, we believe, firſt introduced into St. Thomas's Hoſpital by Dr. George Fordyce, is the remedy on which the author places his chief reliance in the treatment of Eryſipelas.

18. 'Obſervations on the Management of Caſes in which the Face of the Child preſents towards the Os Pubis:' by Dr. *Clarke.* Every practitioner in midwifery is acquainted with the obſtacle to delivery which ariſes from the preſentation here mentioned. This unfavourable poſition of the head may be detected by an attention to the ſituation of the anterior fontanelle, and of the ſutures. If, on examination, the anterior

 fonta-

fontanelle be felt, and the ſagittal ſuture be found running from it towards one of the ſacro-iliac joints, or directly towards the concavity of the os ſacrum, there remains no doubt that the face will be born towards the ſymphyſis pubis.

This poſition of the head, Dr. Clarke remarks, may be remedied in many caſes, without ſubjecting the woman to any additional pain, or the child to any kind of danger. The manner of effecting the change, is, by introducing one or two fingers between the ſide of the head, near the coronal ſuture and ſymphyſis pubis, and preſſing ſteadily againſt the parietal or frontal bone during a labour-pain. When this is done, it will be found, in moſt caſes, that the head yields to the preſſure, till at length the occiput is brought to the groin. This being effected, the reſt ſhould be left to the natural efforts of the woman.'

19. 'Additional Caſes to illuſtrate Mr. *Hunter*'s Method of Performing the Operation for the Cure of the Popliteal Aneuriſm:' by Mr. *Home.* Five caſes of the operation are here detailed, but they ſuggeſt nothing new.

20. 'The Caſe of Pauncнoo, an Inhabitant of the Village of *Gundaſſee*, in the Province of *Bengal*:' by Mr. *Corſe.* This was a caſe of enormous enlargement of the ſcrotum, ariſing from no known cauſe: it is illuſtrated by a plate.

21. 'An Inſtance of the entire Want of Hair in the Human Body:' by Dr. *Wells.* The ſubject of this remarkable caſe is a native and inhabitant of London. At the age of thirty-ſix years, being in perfect health at the time, he obſerved the hair on his head to ſeparate in unuſual quantity, and in about five or ſix weeks almoſt the whole of it came away. At the ſame time the beard gradually became thinner, and at length wholly diſappeared, as did the hair of his eyebrows and eyelaſhes, and every other part of the body. This falling off of the hair does not ſeem to be connected with any conſtitutional affection, nor had the perſon

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ever been infected with the venereal diſeaſe, or uſed any mercurial medicine.

22. ' Hiſtory of a Caſe of Aneuriſms cured by a Natural Proceſs:' by Mr. *J. M. Wilſon*, Houſe Surgeon to the Weſtminſter Hoſpital. In this caſe, which is not a little curious, an aneuriſmal tumour aroſe gradually in the right ham, attended with the uſual ſymptoms. At the end of ſix months the tumour had acquired the ſize of a man's head, was greatly inflamed, and very tenſe. An oozing of bloody ſerum at length began to take place, and continued for many days, when the integuments gave way, and four pounds of blood were loſt in the ſpace of five minutes. The wound afterwards became enlarged, and diſcharged large lumps of coagulum occaſionally. At the end of four months the wound was completely cicatrized.

During the progreſs of this, two ſmall aneuriſms aroſe in the courſe of the femoral artery of the other thigh, which were treated by gentle preſſure, and by this means became ſo much reduced in ſize, as to be ſcarcely diſcerned through the clothes.

23. ' Experiments and Obſervations on the Growth of Bones. From the Papers of the late Mr. *Hunter*:' by Mr. *Home*. The purport of Mr. *Home* in the preſent paper, is, to ſtate the opinions of Mr. Hunter reſpecting the manner in which the growth of bones takes place; in oppoſition to that of *Du Hamel*, and which Dr. *Monro*, the preſent profeſſor of anatomy in Edinburgh, in a late publication, declares himſelf an advocate for: this was, that bones grow by an extenſion of their parts in every direction. According to Mr. Hunter's doctrine, bones grow by two proceſſes going on at the ſame time, and aſſiſting each other: the arteries bring the ſupplies to the bone for its increaſe; the abſorbents at the ſame time are employed in removing portions of the old bone, ſo as to give to the new a proper form. By theſe means the bone becomes larger, without having any material change produced in its external ſhape.

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The priority of Mr. Hunter's difcovery, of the power of the abforbents to act upon the folids of the body, is likewife afferted.

24. 'A Cafe of an Extra-Uterine Fœtus difcharged by the Rectum:' by Mr. *Mainwaring*. This cafe does not differ materially from many others of the fame nature. The woman recovered.

25. 'A Cafe of Pregnancy, in which the Ovum had become difeafed, and was entirely filled with fmall Hydatids:' by Mr. *Home*. The patient in this cafe died in the third or fourth month of pregnancy. Flooding took place, and was followed by vomiting, and fpafms over the whole abdomen. On diffection, the ovum in the uterus, inftead of containing a fœtus, was occupied by an infinite number of hydatids of different fizes, from that of a pin's head to the fize of a common grape. Thefe were connected with each other, and to the inner furface of the ovum, by fhort pedicles or necks; thus differing in form from thofe met with in the liver, which are fpherical, and thofe with long necks and heads found in the brain of fheep.

26. 'Cafe of a Strangulated Hernia, where the Operation fucceeded after the Obftruction had continued eight Days:' by Mr. *Henry Fryer*, Surgeon at Stamford. This cafe illuftrates very ftrongly, the author obferves, that hardly any period is too late to forbid the operation being attempted with fome chance of fuccefs. This chance, however, is greater in proportion as it is more early done.

27. 'An Account of a fingular Difeafe in the upper Maxillary Sinus:' by Mr. *Abernethy*. In this cafe a tumour arofe in the left cheek on which a cauftic was applied, which expofed the bone. The actual cautery was next applied to the tumefied bone, and an opening made into the antrum. From this a large fungus arofe, which could not be reftrained by any medicated applications. The cafe is altogether fingular,

gular, but does not ſuggeſt any thing immediately practical.

28. 'Some Obſervations upon the Combination of Medicines:' by Dr. *George Fordyce*. Every one knows, the author obſerves, that in all the preſcriptions that have come down to us, from the moſt ancient Greek phyſicians until the time when the Roman empire was finally deſtroyed, a vaſt number of remedies were mixed together ſo as to form one maſs: ſuch mixtures were uſed in moſt diſeaſes. The ſame thing is to be found in Celſus, and in all the Roman authors who have treated on medicine, who indeed are very few. The ſame obſervation is applicable to the Arabian phyſicians.—Some works on medicine, which have been found in Hindoſtan, bear marks of the ſame attachment to compoſition of medicines; but they ſeem to be borrowed from the Greek writers, and not to be tranſlations from the Sanſcrit language. This diſpoſition for combining medicines came into modern Europe from the Eaſt, and has been continued down to our days. There are many preſcriptions of Dr. Huxham's extant, which contain four hundred ingredients. In this age, when the foundation of all doctrines has been very properly enquired into, many have queſtioned the utility of mixing medicines together, and have thought it better to exhibit a ſingle medicine. The purport, then, of this paper is to enquire, whether it be better to employ one ſingle ſubſtance by itſelf, to produce medicinal effects, or whether, and in what caſes, it may be better to employ a variety of medicines mixed together.

From the different effects produced by different purgative remedies, the author draws a concluſion in favour of employing mixed medicines, when their general operation is of the ſame kind. For example, he ſays, natron vitriolatum occaſions a purging much ſooner after it has been been exhibited than aloes or rhubarb. Again, aloes and rhubarb occaſion an evacuation

tion of feculent matter, while natron vitriolatum ordinarily occaſions an evacuation of a watery fluid. If an evacuation, therefore, is wanted ſooner than would take place from employing aloes and rhubarb, and, at the ſame time, an evacuation of feculent matter, it evidently would be better to mix theſe purgatives, than to uſe either of them alone.

Two effects, Dr. F. remarks, may be produced at the ſame time, by mixing two medicines together. Thus *tormentil* might be employed to act as an aſtringent upon the inteſtines, and *ipecacuanha* to relax the veſſels of the ſkin; both which operations may be required at the ſame time, as in diarrhœa.

The author endeavours, therefore, to point out what claſſes of medicines admit of mixture, when they have all a tendency to produce the ſame effect; and, in the ſecond place, what claſſes of medicines, having different properties, may be mixed together ſo as to produce good effects. The firſt of theſe propoſitions is alone here treated of.

With reſpect to demulcents, the author has not found any advantage gained by mixing theſe together, excepting from mere convenience of application.

'Bitter medicines, which tend to ſtrengthen the ſyſtem, ſuch as the bark of the cinchona, ſeveral ſpecies of the artemiſia of Linnæus (who, it may be obſerved, has conſtantly endeavoured to miſlead ſtudents in medicine, by taking the name of the genus from the ſpecies which has the leaſt effect, or a diſſimilar effect, from the greateſt number of the ſpecies in it), as abſinthium, abſinthium maritimum, &c. which have been more commonly uſed, and have effects different from artemiſia; ſeveral ſpecies of carduus, camomile, the rinds of fruits of the orange kind; the gentians, and many others, as far as my obſervation has gone, ſit eaſier on the ſtomach, and tend more to ſtrengthen the ſyſtem when mixed together, than when any one of them is employed ſingly. Whether the bitter juice contained in all theſe plants is the ſame ſubſtance, as the ſugar and indigo contained in many plants

plants are the ſame, or whether it be, that the eſſential oils in theſe various plants containing a bitter juice are different, certain it is, that they tend to ſtrengthen the ſyſtem, more when mixed together, than when any one of them is employed ſingly. Preparations of iron, given in ſmall doſes, tend to ſtrengthen the ſyſtem, and were very often employed for this purpoſe before the cinchona came into uſe. Since that time they have been leſs in practice, though certainly rather from the faſhion of medicine, than than that they are not uſeful; but there is a degree of ſtimulus in all of them, which renders them too apt to occaſion frequency of the pulſe; and therefore, as far as I can judge, it is better to give them at the ſame time with ſuch bitter medicines as are ſtrengthening, though they will not well bear to be mixed with them, as they tend to coagulate and deſtroy the bitter juice of the vegetable. The bark of the cinchona, as well as other bitter juices of vegetables of a ſimilar kind; likewiſe preparations of iron, zinc, copper, and tin, have a power of preventing many applications made to the body from exerting ſo conſiderable an effect as they otherwiſe would have done if theſe medicines had not been exhibited; which effect is one among others that has been expreſſed by ſaying, that they diminiſh the irritability of the body. I have not obſerved, that a mixture of any two of theſe medicines is of any uſe in producing this effect. For example, the bark of the cinchona has a power of preventing the cauſe of the return of an intermitting fever from re-producing the diſeaſe; but I have never obſerved, that mixing preparations of zinc, iron, or copper, or any bitter, increaſed the power of the bark of the cinchona, or that the bark of the cinchona increaſed the power of any of theſe medicines in preventing the return of an intermitting fever.'

The mixture of ſeveral different vegetable aſtringents, according to the author's experience, ſeems to be much better than giving any one of them ſingly, whether

whether it be to check fecretions (as purgings), in cafes where it is proper to employ aftringents for that purpofe, or in hæmorrhage. There is, alfo, an advantage, he obferves, in mixing different fpices, and other fuch ftimulating fubftances together. With refpect to medicines which have a tendency to produce relaxation in all the veffels and fibres of the body, fuch as preparations of antimony, ipecacuanha, neutral falts, &c., he is not able to determine.

'In evacuants of all kinds, where the evacuant is applied immediately to the part from whence the evacuation is to take place, or, in other words, where it is applied to ftimulate the ends of the excretory ducts in the membrane, on which the fecretion is thrown out; as when a ftimulating medicine is put into the mouth, fo as to act upon the ends of the excretory ducts of the falivary glands opening into the mouth; it is evidently better, and more efficacious, to mix feveral different fpecies of ftimulants, fuch as fpices or acids with neutral falts, than to employ any one of thefe fingly.' 'In like manner, when a fubftance is taken into the ftomach with a view to produce ficknefs, and confequently vomiting, I have generally found it better to mix fubftances together, fuch as ipecacuanha and tartarized antimony, than to employ either of them fingly; or in cafe of poifon being fwallowed, it is better, in order to produce vomiting quickly, to mix zincum vitriolatum and ipecacuanha, than to employ either of them fingly.'

The obfervations relating to the entrance of medicines into the blood-veffels, and acting upon the ends of the excretory ducts, are important. 'Many have conceived,' the author obferves, 'that medicines taken into the blood-veffels could not reach fuch fecretory organs fo as to ftimulate them, when the fecretion from thefe organs is extremely fmall. It has been thought, for inftance, that no fubftance could get into the blood-veffels, and be fecreted by the glands which open upon the mucous membrane of the

the lungs, on account of the extremely ſmall ſecretion which commonly takes place in theſe glands, it not being perhaps more than the five hundredth part of the whole ſecretions that take place in the body. It has been therefore thought, that the quantity of ſtimulating matter contained in five grains of the root of ſquills, which certainly cannot be more than one grain, could not poſſibly affect the lungs, as there could not be a five hundredth part of a grain applied to the whole of theſe glands at once, and perhaps not a millionth part of a grain to any one of them; but who can ſay that a millionth part of a grain of ſquills may not act upon one of the glands of the lungs, when certainly an infinitely leſs quantity of a particle of light (if light be a body, as we have the greateſt reaſon to believe) is capable of acting upon the retina?

'It ſeems therefore clear, that ſubſtances may get into the blood-veſſels, and be applied to the glands, ſo as to increaſe the action of the ſecretory ducts, and produce a greater ſecretion.'

'As far as my experience leads me, a mixture of medicines tending to increaſe the ſecretion from the glands of the lungs, in conſequence of being thrown into the ſtomach, and being abſorbed into the blood-veſſels, is much more powerful in increaſing the ſecretion from the glands of the lungs than one ſingly. So far as I can confide in my own obſervation, it is better to mix ſquills with gum-ammoniac, than to employ either of them ſingly; and it is even better to mix gum-ammoniac, aſſafœtida, ſquills, and colchicum all together, than to employ ſquills and gum-ammoniac by themſelves.'

The author is well aware that mixtures of medicines have been carried to a degree of abſurdity. 'This,' he obſerves, 'made me at firſt reprobate all mixtures of medicines having the ſame effect, and conceive that it would be much better to employ ſome ſimple medicine for each particular purpoſe; but

but I have now been convinced by long and repeated experience, that this is not well-founded. How far the extent of this doctrine may go, it is difficult to ſay, and whether all the medicines tending to have the ſame effect ſhould be mixed together, or two or three, or four, or five, or how many.

'There are in different vegetables very often exactly the ſame ſubſtances. In a vaſt number of plants there is ſugar; in a great number there is the ſame aſtringent juice; in many others there is the ſame indigo. If ſuch juice be pure and free from all other ſubſtances, it never can be proper or uſeful to employ it as obtained from different plants. If it be not pure, but mixed with other juices of the plants in which it is found, it may be proper to mix the ſeveral plants together containing it, as the other juices of each of theſe plants may err in a different manner, and therefore the part of the body to which they are applied may bear a great many ſmall errors better than one great one. If, however, the ſubſtance can be got pure, it would undoubtedly be much better employed ſingly.'

29. 'The Operation of Puncturing the Bladder above the Pubis, and through the Rectum, illuſtrated by Caſes:' by Mr. *Home*. Caſes of ſuppreſſion of urine, in which the operation of puncturing the bladder has been performed, have been few in number, and the hiſtories of them are diſperſed through a variety of publications. The preſent paper will make a valuable addition to the records of ſurgery upon this important ſubject. Four caſes are related which terminated favourably; in one of them the bladder was punctured above the pubis, and in the others through the rectum. Theſe have given occaſion to the following general obſervations reſpecting the operation of puncturing the bladder.

'When the puncture is made above the pubis, the canula which encloſes the trocar is not to be removed till the ſurrounding parts have been conſolidated by inflam-

inflammation, ſo as to prevent the urine, in its paſſage out, from inſinuating itſelf into the neighbouring parts; for wherever the urine lodges, mortification takes place. An advantage, therefore, which may ariſe from a more flexible inſtrument remaining in the bladder, is more than counterbalanced by its not filling compleatly the aperture through the coats of the bladder, and allowing the urine to eſcape into the cellular membrane.

'When the coats of the bladder are inflamed and irritated to a very great degree, a wound in them is not neceſſarily productive of any bad conſequences; and when theſe ſymptoms are brought on by a retention of urine, all that is requiſite for their removal, is, not allowing any quantity of water to be accumulated in the bladder.

'When the puncture is made into the bladder through the rectum, it is not neceſſary to retain the canula in the orifice beyond the time in which inflammation conſolidates the ſides of the wound, as there is no danger of the aperture cloſing up, till there is another paſſage made for the urine.*

'The wound in the rectum, whether it has a canula retained in it or not, does not allow the urine to eſcape, till a ſufficient quantity is collected to make the coats of the bladder act for its expulſion; and the quantity neceſſary for that purpoſe will vary according to the ſtate of the bladder at the time.

'The bladder, although contracted to a ſmall ſize by long-continued irritation, almoſt immediately, on being relieved from that irritation, has a power of recovering itſelf, and allowing of a much greater degree of diſtention; otherwiſe the bladder in the ſecond of theſe caſes, which had not for many years retained more than three ounces of water at any one time, could not, in four days after the laſt ſtricture was deſtroyed, have retained half a pint.'

'* The cylindrical trocar, recommended by Pouteau, appears preferable to the flattened one, ſince it cannot be ſo readily obſtructed by mucus.'

Art. XXXVI. *Philosophical Transactions of the Royal Society of London, for the Year* 1800. *Part* I. Quarto, 238 pages, price 13s. 6d. London, 1800. Elmsley.

THE first article in the collection before us is the *Croonian* Lecture, by Mr. *Home*, and treats of the structure and uses of the *Membrana Tympani* of the Ear. The *membrana Tympani* has always been considered as a common membrane, which, by means of muscles belonging to the malleus being stretched or relaxed, became fitted, in its various degrees of tension, to convey the vast variety of external sounds to the internal organ. Its shape, situation, and office, have procured it the name of drum of the ear. From its minuteness in the human ear, but little attention has been paid by anatomists to its structure; but in the elephant this part is so very large, that the parts of which it is composed are readily distinguished, and are even conspicuous to the naked eye: muscular fibres are seen passing along the membrane, in a radiated manner, from the bony rim which surrounds it, towards the handle of the malleus, to which the central part of the membrane is firmly attached. This discovery in the elephant led the author to detect a similar structure in the human membrana tympani.

If the membrana tympani of the human ear is completely exposed on both sides, by removing the contiguous parts, and the cuticular covering is carefully washed off from its external surface, then, by placing it in a clear light, the radiated direction of its fibres may be easily detected. If a common magnifying glass is used, they are rendered nearly as distinct as those of the elephant appear to the naked eye; their course is exactly the same; and they differ in nothing but in being formed upon a smaller scale.

When viewed in a microscrope magnifying twenty-three times, the muscular fibres are beautifully conspicuous,

cuous, and appear uniformly the ſame throughout the whole ſurface, there being no central tendons, as in the diaphragm; the muſcular fibres appear only to form the internal layer of the membrane, and are moſt diſtinctly ſeen when viewed on that ſide.

In examining this membrane, Mr. Home obſerves, in different ſubjects, the parts were frequently found in a more or leſs morbid ſtate. In one inſtance, the membrane was found loaded with blood-veſſels, was leſs tranſparent than uſual, and was united by cloſe adheſion to the point of the long proceſs of the incus. In another inſtance, there was a preternatural oſſification adhering to it, at a ſmall diſtance from the end of the handle of the malleus.

The knowledge of a muſcular ſtructure in the membrana tympani, the author obſerves, enables us to explain many phænomena in hearing, which have not hitherto been accounted for in a ſatisfactory manner. It is principally by means of this muſcle that accurate perceptions of ſound are communicated to the internal organ, and that the membrana tympani is enabled to vary the ſtate of its tenſion, ſo as to receive them in the quick ſucceſſion in which they are conveyed to it.

In man, and the more perfect quadrupeds, the organ of hearing conſiſts of the following parts: the membrana tympani, ſituated between the external paſſage and the cavity of the tympanum; four ſmall bones, called *malleus*, *incus*, *orbicularis*, and *ſtapes*, which form a chain acroſs the tympanum, connecting the membrana tympani with another membrane lining the foramen ovale, which opens into the veſtibulum, a more internal part of the organ of hearing. The veſtibulum, which is completely ſeparated from the tympanum by the membrane that lines the foramen ovale, communicates freely with the cochlea and ſemi-circular canals: but theſe cavities are filled with

a watery liquor, and have no communication (as the tympanum has) with the external air.

The following uses have generally been assigned to the parts now mentioned.

The membrana tympani was supposed to be adapted to receive impressions, by the combined action of the *tensor* and *laxator* muscles varying the degree of its tension, so as to bring it in unison with different sounds: these impressions were conducted, by the chain of bones, to the vestibulum, cochlea, and semicircular canals; in which cavities, particularly the cochlea, they were supposed to undergo some modification, before they were impressed upon the nerves spread upon the linings of these cavities.

The function of modifying impressions of sound was assigned to the cochlea, partly from the delicacy of its internal structure, supposed to resemble a musical instrument, and partly from there being no other part of the organ apparently suited for repeating the variety of delicate sounds which pass into the ear; the changes that could be produced upon the membrana tympani by the muscles of the malleus, being considered as incapable of answering that purpose.

With respect to this theory, it is true, Mr. Home observes, that the membrana tympani is stretched and relaxed by the action of the muscles of the malleus, but not for the purpose alledged in the commonly received theory. It is stretched, in order to bring the radiated muscle of the membrane itself into a state capable of acting, and of giving those different degrees of tension to the membrane which empower it to correspond with the variety of external tremors: when the membrane is relaxed, the radiated muscle cannot act with any effect, and external tremors make less accurate impressions.

The membrana tympani, with its tensor and radiated muscles, may be not unaptly compared to a monochord, of which the membrana tympani is the

string;

ſtring; the tenſor muſcle the ſcrew, giving the neceſſary tenſion to make the ſtring perform its proper ſcale of vibrations; and the radiated muſcle acting upon the membrane like the moveable bridge of the monochord, adjuſting it to the vibrations required to be produced. The combined effects of the action of theſe muſcles give the perceptions of grave and acute tones; and in proportion as their original conformation is more or leſs perfect, ſo will their actions be, and, conſequently, the perceptions of ſound which they communicate.

This adjuſtment of the membrana tympani explains, the author thinks, the difference between a muſical ear, and one which is too imperfect to diſtinguiſh the different notes in muſic, and which appears to ariſe entirely from the greater or leſs nicety with which the muſcle of the malleus renders the membrane capable of being truly adjuſted. If the tenſion be perfect, all the variations produced by the action of the radiated muſcle will be equally correct, and the ear truly muſical; but if the firſt adjuſtment is imperfect, although the action of the radiated muſcle may ſtill produce infinite variations, none of them will be correct: the effect, in this reſpect, will be ſimilar to that produced by playing upon a muſical inſtrument which is not in tune. The hearing of articulate ſounds requires leſs nicety in the adjuſtment than of inarticulate or muſical ones: an ear may therefore be able to perceive the one, although it is not fitted to receive diſtinct perceptions from the other.

Several ways in which the correctneſs of hearing is affected by the wrong actions of the muſcles of the tympanum, that appeared to be inexplicable, can, in the author's opinion, be readily accounted for, now that the means by which the membrane adjuſts itſelf are underſtood. The following are adduced as inſtances of this kind.

'*Caſe* 1. A gentleman, thirty-three years of age, who poſſeſſed a very correct ear, ſo as to be capable of

 ſing-

ſinging in concert, though he had never learned muſic, was ſuddenly ſeized with a giddineſs in the head, and a ſlight degree of numbneſs in the right ſide and arm. Theſe feelings went off in a few hours, but on the third day returned, and for ſeveral weeks he had returns of the ſame ſenſations. It was ſoon diſcovered that he had loſt his muſical ear; he could neither ſing a note in tune, nor in the ſmalleſt degree perceive harmony in the performance of others. For ſome time he himſelf thought he had become a little deaf, but his medical attendant was not ſenſible of that in converſation. Upon going into the country he derived great benefit from exerciſe and ſea-bathing.

‘ Twenty months after the attack, he was capable of ſinging a Scotch air with tolerable exactneſs, though he could not ſing in concert. He continued to improve in his health, and in the courſe of two or three years completely recovered his ear for muſic

‘ In this caſe there appeared to be ſome affection of the brain, which had diminiſhed the actions of the tenſor muſcles of the membrana tympani, through the medium of the nerves which regulate their actions; this gradually went off, and the muſcles recovered their former action.

‘ *Caſe* 2. A young lady was ſeized with a frenzy which laſted for ſeveral years. Previous to her derangement, ſhe was incapable of ſinging in tune, from the want of an ear for muſic; but in the courſe of her madneſs ſhe frequently, to the aſtoniſhment of her relations, ſung a tune with tolerable correctneſs.

‘ This caſe is the reverſe of the former; and as it aroſe from a directly contrary affection of the brain, may be conſidered as the reſult of an unuſual degree of action in the tenſor muſcles, giving the membrane a more correct adjuſtment than it had before.

‘ *Caſe* 3. An eminent muſic maſter, after catching cold, found a confuſion of ſounds in his ears. Upon ſtrict attention, he diſcovered that the pitch of one ear was half a note lower than that of the other; and that

that the perception of a ſimple ſound did not reach both ears at the ſame inſtant, but ſeemed as two diſtinct ſounds, following each other in quick ſucceſſion, the laſt being the loweſt and weakeſt. This complaint diſtreſſed him for a long time, but he recovered from it without any medical aid.

'In this caſe the whole defect appears to have been in the action of the radiated muſcle, exerted neither with the ſame quickneſs and force in one ear as in the other, ſo that the ſound was half a note too low, as well as later in being impreſſed upon the organ.'

Some obſervations next occur on the ſtructure and uſes of this organ in other animals, which it would carry us too far to notice more particularly. We proceed, therefore, to notice another paper, the 8th, in the preſent collection, and which relates to the ſame ſubject. Its title is, 'Obſervations on the Effects which take place from the Deſtruction of the Membrana Tympani of the Ear:' by Mr. *Aſtley Cooper.* Anatomiſts have endeavoured, Mr. Cooper remarks, to aſcertain, by experiments on quadrupeds, the loſs of power which the organ of hearing would ſuſtain by perforating the membrana tympani: dogs have been made the ſubject of theſe trials; but the reſults have been neither clear nor ſatisfactory, and they accord but little with the phænomena here related.

Mr. Cheſelden had conceived the deſign of making the human organ the ſubject of direct experiment; and a condemned criminal was pardoned, on condition of his ſubmitting to it; but, popular outcry being raiſed, it was thought proper to relinquiſh the idea.

The object of this paper is to ſhew, that the loſs of the membrana tympani, in both ears, far from producing total deafneſs, occaſions only a ſlight diminution of the powers of hearing. A caſe is related

 where

where inflammation and suppuration took place in both ears; the discharge was thin and offensive; and, in the matter, bones, or pieces of bones, were observable. The immediate consequence was a total deafness, which continued for three months; the hearing then began to return, and, in about ten months, was restored to a tolerable state. As a proof that each membrana tympani was imperfect, on the patient's filling his mouth with air, closing the nostrils, and contracting the cheeks, the air, thus compressed, was heard to rush through the meatus auditorius with a whistling noise, and the hair hanging from the temples became agitated by the current.

Art. 2. 'On the Method of Determining, from the real Probabilities of Life, the Values of Contingent Reversions in which three Lives are involved in the Survivorship:' by *William Morgan*, Esq.

3. 'Abstract of a Register of the Barometer, Thermometer, and Rain, at *Lyndon*, in *Rutland*, for the Year 1798:' by *Thomas Barker*, Esq.

4. 'On the Power of Penetrating into Space by Telescopes; with a comparative Determination of the Extent of that Power in Natural Vision, and in Telescopes of various Sizes and Constructions:' by *William Herschell*, LL.D. &c. The learned author shews satisfactorily, that the power of penetrating into space by telescopes is very different from magnifying power, and that, in the construction of instruments, these two powers ought to be considered separately. This distinction, indeed, must have been felt long ago, as is evident by the construction of what are called night glasses; but its theory has not before been enquired into.

5. 'A Second Appendix to the Improved Solution of a Problem in Physical Astronomy, inserted in 1798, containing some further Remarks, and Improved Formulæ for computing the Co-efficients A and B; by which the arithmetical work is considerably

ably ſhortened and facilitated:' by the Rev. *John Hellins*, B.D. &c.

6. 'Account of a Peculiarity in the Diſtribution of the Arteries ſent to the Limbs of ſlow-moving Animals; together with ſome other ſimilar Facts:' by Mr. *Anthony Carliſle*, Surgeon. The diſſection of the *Macauco*, or *Lemur Tardigradus*, of LINNÆUS, led the author to the diſcovery of a very curious deviation from the ordinary ſtructure of animals, with reſpect to the diſtribution of the arteries going to the limbs of this animal. This peculiarity of arrangement is confined to the axillary and iliac arteries. 'Theſe veſſels,' Mr. Carliſle obſerves, 'at their entrance into the upper and lower limbs, are ſuddenly divided into a number of equal-ſized cylinders, which occaſionally anaſtomoſe with each other. They are excluſively diſtributed on the muſcles; whilſt the arteries ſent to all the parts of the body, excepting the limbs, divide into the uſual arboreſcent form; and even thoſe arteries of the limbs which are employed upon ſubſtances not muſcular, branch off like the common blood-veſſels. I counted twenty-three of theſe cylinders parallel to each other, about the middle of the upper arm, and ſeventeen in the inguinal faſciculus.

'This fact appeared at firſt too ſolitary for the foundation of any phyſiological reaſoning; but, having ſince had an opportunity of proſecuting the enquiry among animals of ſimilar habits and character, I have been encouraged to hope that the reſult may eventually aſſiſt in the elucidation of muſcular motion. The *bradypus tridactylus*, or great American Sloth, has a ſimilar diſtribution of the arteries of its limbs to that already deſcribed in the *lemur tardigradus*. The communication of theſe veſſels with each other are more frequent than in the *lemur tardigradus*, and their number conſiderably greater. I counted forty-two ſeparate cylinders upon the ſuperficies of the brachial faſciculus; and, from the bulk of the faſciculus, I eſtimate that there were twenty, or more, concealed

ed in the middle. The lower extremity has its arteries leſs divided, and they are of larger diameter. I obſerved only thirty-four branches in the middle of the thigh; and the firſt ſeries of ramifications were larger than the ſubſequent ones. May not this have ſome relation to the greater diſtance of the lower limb from the heart? The extremely ſlow movements of the *bradypus tridactylus* are ſufficiently known among natural hiſtorians.

‘ The *bradypus didactylus* has its arterial ſyſtem diſtributed in ſome degree like the *tridactylus*; but the brachial artery in the upper limb is much leſs ſub-divided; and, in the lower limb, the arteries of the plexus afterwards divide a few times in the arboreſcent form. It may be worthy of remark, that this correſpondence of arrangement, in the arteries of the leſſer ſloth, bears a ſtriking analogy with the ſtructure and habits of the large American Sloth; the movements of the *bradypus didactylus* being univerſally repreſented quicker than thoſe of the *bradypus tridactylus*.

‘ The *Lemur Loris* was next examined, and its arterial ſyſtem was found to reſemble thoſe already deſcribed; but as the animal had been preſerved in very ſtrong ſpirit, the veſſels were ſo corrugated as not to admit of injection. The two *bradypi* were injected with quickſilver. The natural hiſtory of the *lemur loris* appears to be not very well aſcertained; but it is a ſlow-moving animal, and has been confounded with the ſpecies called *tardigradus*, although doubtleſs a much more agile creature.’

In all the quadrupeds above-mentioned, the other blood-veſſels, as well as the nerves, preſented the common appearances.

The effect of this peculiar diſpoſition of the arteries, in the limbs of theſe ſlow-moving animals, will be that of retarding the velocity of the blood. It may be difficult to determine, the author obſerves, whether the ſlow movement of the blood ſent to the muſcles of the

the limbs be a ſubordinate convenience to other primary cauſes of their ſlow contraction, or whether it be of itſelf the immediate and principal cauſe. The facts at preſent aſcertained, relative to muſcular motion, do not authorize us to ſpeak decidedly of the ſhare which the vaſcular ſyſtem holds in the operation of muſcular contraction. Certain it is, that a larger proportion of arteries is ſent to the muſcles of quadrupeds, than to the ordinary ſubſtances; and the extreme redneſs of theſe organs ſhews that their capillaries are of large diameter. A greater degree of redneſs is alſo obſervable in thoſe muſcles which are moſt frequently called into action. The habits of life among the tardigrade animals, give occaſion for the long-continued contraction of ſome muſcles in their limbs: theſe creatures are repreſented clinging to the boughs of trees, and remaining thus, without locomotion, for ſeveral hours. The powers which require ſo long a time to determine the contraction of a ſeries of muſcles are probably no leſs ſlow in reſtoring the parts to their former condition; or if the reſtoration is to be effected by antagoniſt muſcles under the ſame circumſtances, then, the flexion and extenſion of every part of the limbs will correſpond as to time.—It is worth obſerving, that the macauco was ſufficiently quick in the movements of its head to ſnap a perſon's finger when touched incautiouſly; and the motion of its jaw, when chewing, was not ſlower than in other animals.

7. 'Outlines of Experiments and Inquiries, reſpecting Sound and Light:' by *Thomas Young*, M.D. &c. This paper is purely mathematical.

9. 'Experiments and Obſervations on the Light which is Spontaneouſly Emitted, with ſome degree of Permanency from various Bodies:' by *Nathaniel Hulme*, M.D. By the term *ſpontaneous light*, the author means that ſpecies of illumination which is emitted

emitted from various substances: these are principally the following.

1. Marine animals, both in a living state, and when deprived of life. As instances of the first, may be mentioned the shell-fish called *Pholas*, the *Medusa Phosphorea,* and various other *Mollusca.* When deprived of life, marine fishes in general seem to abound in this kind of light: herrings and mackerel were those employed in the author's experiments.

The flesh of quadrupeds has also been observed to emit light. Instances of this are mentioned by *Fabricius ab Aquapendente, T. Bartholin,* Mr. *Boyle,* and Dr. *Beale.* In the class of insects are many which emit light very copiously, particularly several species of *Fulgora,* or lantern-fly, and of *Lampyris,* or glow-worm; also the *Scolopendra Electrica,* and a species of crab, called Cancer Fulgens.

Rotten wood is well known to emit light spontaneously. Peat earth also has the same property. Of the effects of the latter, a remarkable instance is mentioned in Plot's Nat. Hist. of Staffordshire, p. 115.

The experiments here related are numerous, and not a little curious: they are divided into different sections. Those of the first section shew clearly that the quantity of light emitted by putrescent animal substances is not in proportion to the degree of putrefaction, as is commonly supposed; the light beginning to be emitted before any signs of putrefaction appear. As soon as a great degree of putrescence has taken place, the luminous property is destroyed, and the light extinguished.

The second head of experiments shews that the light here treated of is a constituent principle of the body, and may be separated from it. 'A fresh herring was split or divided longitudinally, by a knife, into two parts. Then, about four drams of it being cut across, were put into a solution composed of two drams of Epsom salt, or vitriolated magnesia, and two ounces of cold spring water drawn up by the pump. The liquid was contained in a wide-mouthed three-

ounce

ounce phial, which was placed in the laboratory. Upon carefully examining the liquid, on the fecond evening after the procefs was begun, I could plainly perceive a lucid ring (for the phial was round) floating upon the top of the liquid, the part below it being dark; but, on fhaking the phial, the whole at once became beautifully luminous, and continued in that ftate. On the third evening, the light had again rifen to the top; but the lucid ring appeared lefs vivid, and on fhaking the phial as before, the liquid was not fo luminous as on the preceding night.'—With fea-falt, and with fea-water, the refult was the fame. Epfom, and Glauber's falt produced a fimilar effect. The light in thefe cafes feems to be incorporated with the whole fubftance of the fifh. It appears to be feparated, by the menftruum employed, in the fame way that the principles of any other body are feparated, by the menftruum fitted to decompofe it. Light, the author obferves, is probably the firft conftituent principle that efcapes after the death of marine fifhes.

The 3d fection relates to the power which fome fubftances have of extinguifhing fpontaneous light, when it is applied to them. It was found that the luminous matter proceeding from the herring and the mackerel was quickly extinguifhed when mixed with the following fubftances: 1. Water alone. 2. Water impregnated with quick-lime. 3. Water impregnated with carbonic acid gas. 4. Water impregnated with hepatic gas. 5. Fermented liquors. 6. Ardent fpirits. 7. Mineral acids, both in a concentrated and diluted ftate. 8. Vegetable acids. 9. Fixed and volatile alkalies, when diffolved in water. 10. Neutral falts; viz. *faturated* folutions of Epfom falt, of common falt, and of fal ammoniac. 11. Infufions of chamomile flowers, of long pepper, and of camphor, made with boiling-hot water, but not ufed till quite cold. 12. Pure honey, if ufed alone.

On

On the other hand it appears that certain bodies have a power of preſerving ſpontaneous light for ſome time. '*Experiment.* Some luminous matter ſcraped from the herring was mixed with a ſolution of two drams of Epſom ſalt in two ounces of cold pump water: after ſhaking very well for ſome time the phial which contained them, the whole liquid became richly impregnated with light, and continued ſhining above twenty-four hours. This experiment was frequently repeated, and with the ſame effect.'—The ſame effect was produced by dilute ſolutions of moſt of the neutral ſalts; alſo by thoſe of honey and ſugar. Thus we are enabled to take light and diffuſe it through water, ſo as to render the whole liquid moſt brilliantly luminous; or, in other words, to impregnate water with light.

From the ſucceeding ſection it appears, that though ſpontaneous light is extinguiſhed by ſome bodies or ſubſtances, it is not loſt, but may be again revived in its former ſplendor, and that by the moſt ſimple means. Thus, if the light be extinguiſhed by ſaturating the luminous fluid with a neutral ſalt, it may again be reſtored by dilution, and in this manner may be repeatedly extinguiſhed, and as often revived.

Spontaneous light is rendered more vivid by motion. It is not, however, accompanied with any degree of ſenſible heat that is diſcoverable by a thermometer.

A great degree of cold, ſuch as may be produced in frigorific mixtures, was found to extinguiſh ſpontaneous light, both in fiſhes, in the glow worm, and in rotten wood. The extinction, however, was only temporary, the light reviving again in its full ſplendor as ſoon as the temperature was reſtored.

The effects of heat on ſpontaneous light were next examined. One ſide of a luminous herring was held before the fire for a ſhort ſpace of time, but ſo as to receive its heat very ſtrongly. The light by this means

was

was permanently extinguiſhed. The ſame effect was produced by plunging it into boiling-hot water.

A piece of ſhining wood became more lucid by being put into tepid water at about 90° of temperature. At 110° the light became apparently extinct, but afterwards ſomewhat revived. By the heat of boiling water, ſhining wood became wholly and permanently extinct. The glow-worm, both dead and alive, was affected in a nearly ſimilar manner.

Any of the ſaline ſolutions mentioned, being impregnated with luminous matter, and left ſome time at reſt, are rendered more lucid by a *moderate* degree, but are extinguiſhed by a *greater* degree, of heat, as from 96° to 100°. If much heat be applied to the bottom of a tube filled with illuminated liquid, which has been ſome time at reſt, the light will deſcend in luminous ſtreams, from the top of the tube to the bottom, and be gradually extinguiſhed.

The laſt ſection relates to the effects of the human body, and of the animal fluids, upon ſpontaneous light. *Experiment.* On touching the luminous matter of fiſhes, the light adhered to the fingers and different parts of the hands; remained very lucid for ſome little time, and then gradually diſappeared. Applied to other ſubſtances, as wood, ſtone, and the like, it continued luminous for many hours. A piece of ſhining wood was rendered more lucid by being held for ſome time in the palm of the hand; as was a dead glow-worm by being breathed upon ſeveral times.

Herring light was ſoon extinguiſhed by being mixed with the craſſamentum of the blood, eſpecially if this were in a putreſcent ſtate. With recent ſerum the light was vivid, and of long duration. Urine and bile, eſpecially when putrid, ſoon deſtroyed ſpontaneous light. Recent milk continued luminous above twenty-four hours, when mixed with mackerel light; but, when turned ſour, it quickly extinguiſhed it.

Art.

Art. 10. 'Account of a Series of Experiments, undertaken with the View of Decompofing the Muriatic Acid:' by Mr. *William Henry.* Modern chemiftry, the author obferves, notwithftanding its rapid advancement during the few laft years, ftill prefents to its cultivators feveral interefting objects both of analytic and fynthetic inquiry. Among the former, the decompofition of the muriatic, and of certain other acids, holds a diftinguifhed place; for our curiofity refpecting the nature of thefe bodies is ftrongly excited by the influence which this difcovery would have on the general doctrines of chemical fcience, as well as on the explanation of individual facts. The theory of the formation of acids, for example, one of the moft important parts of the new fyftem of chemiftry, muft be regarded as incomplete, and liable to fubverfion, till the individual acids now alluded to have been refolved into their conftituent principles.

Refpecting the conftitution of the muriatic acid, we are ftill wholly in the dark;* nor has the ingenious author of the paper before us been more fuccefsful than his predeceffors in the inveftigation of its nature. He firft examined the effects of electricity on muriatic acid gas confined over mercury; but the diminution of this gas always ftopped at a certain point, beyond which it could not be carried by continuing the fhocks; thus proving, that not the fmalleft progrefs had been made towards the decompofition of the muriatic acid.

The author next tried the effect of electrifying the muriatic acid gas with inflammable fubftances. For this purpofe, charcoal (a body which of all others has the ftrongeft attraction for oxygen), and the carbonated hydrogenous gas were employed; but equally

* It has been of late afferted, that hydrogen is the bafis of the muriatic acid; but, from the experiments here detailed, it appears clearly that the hydrogen thus produced arifes from the decompofition of the water contained in the gafes, and which it feems impoffible wholly to deprive them of. *Ed.*

without

without fuccefs. By electrifying the latter with a portion of muriatic acid gas, all that was thus effected was the decompofition of the water of the two gafes by the carbon of the combuftible gas, carbonic acid being generated.

Since, therefore, carbon, though placed under the moft favourable circumftances for abftracting from the muriatic acid, and combining with, its oxygen, evinces no fuch tendency, it may be inferred, that if the muriatic acid be an oxygenated fubftance, its radical has a ftronger affinity for oxygen than charcoal poffeffes. From the refult of the experiments here ftated, all hope, the author thinks, muft be relinquifhed of effecting the decompofition of this acid in the way of fimple elective affinity. They furnifh, alfo, a ftrong probability, that the bafis of the muriatic acid is fome unknown body; for, no combuftible fubftance with which we are acquainted can retain oxygen, when fubmitted, in contact with charcoal, to the action of electricity, or of a high temperature. The analyfis of this acid muft, he thinks, in future be attempted with the aid of complicated affinities.

11. The laft article in the volume before us relates to 'A New Fulminating Mercury:' by Mr. *Edward Howard.*—The author has difcovered that mercury, and moft, if not all, its oxides, may, by treatment with nitric acid and alkohol, be converted into a whitifh cryftallized powder, poffeffing all the inflammable properties of gunpowder, as well as many peculiar to itfelf. The pure red oxide of mercury is intermixed with alkohol, and upon both nitric acid is affufed. After fome minutes have elapfed, a fmell of ether is perceptible, and a white denfe fmoke, much refembling that from the *liquor fumans* of Libavius, is emitted with ebullition. The mixture then throws down a dark-coloured precipitate, which by degrees becomes nearly white. This precipitate is then feparated by filtration.

A conſiderable number of experiments were made with this ſubſtance, and which are here given in detail. Its properties, in compariſon with gunpowder, are thus deſcribed by the author:—'It takes fire at the temperature of 368° Fahrenheit; explodes by friction,* by flint and ſteel, and by being thrown into concentrate ſulphuric acid. It is equally inflammable under the exhauſted receiver of an air-pump, as ſurrounded by atmoſpheric air; detonates loudly, both by the blow of a hammer, and by a ſtrong electrical ſhock. Notwithſtanding the compoſition of fulminating ſilver, and of fulminating gold, differ eſſentially from that of fulminating mercury, all three have ſome ſimilar qualities. In tremendous effects, ſilver undoubtedly ſtands firſt, and gold, perhaps, the laſt. The effects of the mercurial powder admit of little compariſon. The one exerts, within certain limits, an almoſt inconceivable force: its agents ſeem to be gas and caloric, very ſuddenly ſet at liberty, and both mercury and water thrown into vapour. The other diſplays a more extended but inferior power: gas and caloric are, comparatively ſpeaking, liberated by degrees; and water, according to Count *Rumford,* is thrown into vapour.

'Hence it ſeems, that the fulminating mercury, from the limitation of its ſphere of action, can ſeldom, if ever, be applied to mining; and, from the immenſity of its initial force, cannot be uſed in fire-arms, unleſs it becomes an object to deſtroy them; perhaps, where it is the practice to ſpike cannon, it may be of ſervice; becauſe, I apprehend, it may be uſed in ſuch a manner as to burſt cannon, without diſperſing any ſplinters.'

* Conſequently it ſhould not be incloſed in a bottle with a glaſs ſtopper.

ART.

Art. XXXVII. Phytologia; *or, the Philoſophy of Agriculture and Gardening: with the Theory of Draining Moraſſes, and with an improved Conſtruction of the Drill Plough. By* Erasmus Darwin, *M.D. F.R.S. Author of Zoonomia, and of the Botanic Garden.* Quarto, 612 pages, price 1*l.* 11*s.* 6*d.* London. 1800. Johnson.

DR. DARWIN is well known to our readers as the author of *Zoonomia*, a work that has deſervedly attracted a large ſhare of the public attention, and which reflects honour on the genius and learning of the writer. The preſent treatiſe, though leſs immediately connected with the human economy and medicine than the work above-mentioned, is yet ſufficiently ſo to induce us to examine and record its moſt ſtriking features. If it be true, as undoubtedly it is, that our knowledge of the human economy has been enlarged by the reſearches of ingenious men into the ſtructure and functions of the inferior claſſes of animals, there is little reaſon to doubt that general phyſiology may receive illuſtration from an inveſtigation of the laws of vegetable exiſtence. One common principle appears to pervade the whole of living nature (including under this denomination the vegetable tribes), by the contemplation of which, in the varied lights in which animal and vegetable beings preſent it to our view, we may probably extend our knowledge of the living principle, the *aura divina*, and become better acquainted with its laws. The knowledge thus derived may in its turn be applicable to beneficial purpoſes in the conduct of the human frame and its derangements; and hence the ſtudy of vegetable phyſics becomes no unimportant object of purſuit to the practical phyſician.

In regard to the ſuſtenance of man, the ſubject is ſcarcely leſs important. Agriculture and gardening, Dr. Darwin obſerves, though of ſuch great utility in

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producing the nutriment of mankind, continue to be only arts, confifting of numerous detached facts and vague opinions, without a true theory to connect them, or to appretiate their analogy; at a time, too, when many parts of knowledge of much inferior confequence have been nicely arranged, and digefted into fciences. Our imperfect acquaintance with the phyfiology and economy of vegetation is the principal caufe of the great immaturity of our knowledge of agriculture and gardening.

The ingenious author, therefore, firft attempts a theory of vegetation, deduced principally from the experiments of *Hales, Grew, Malpighi, Bonnet, Du Hamel, Buffon, Spallanzani, Prieftley*, and the philofophers of the *Linnean* fchool; with a few obfervations and opinions of his own; fome of which have already appeared in *Zoonomia*, and in the Notes to the *Botanic Garden*, but are here corrected and enlarged. To Zoonomia, the prefent work, as the author obferves, may be juftly deemed a fupplement, as it is properly a continuation of the fame fubject,—the Laws of Organic Exiftence.

To reafon rightly on many vegetable phenomena, Dr. Darwin remarks, we fhall find it neceffary to confider vegetables as in reality an inferior order of animals. However fanciful the fuppofition may appear to fome, there are not wanting abundance of arguments, both ingenious and folid, to confirm it. We have fo accuftomed ourfelves to confider life and irritability to be affociated with palpable warmth and vifible motion, that we find a renitency in ourfelves to afcribe them to the comparatively cold and motionlefs fibres of plants.

The general analogy between animals and vegetables is fhewn in the following quotation. The individuality of buds is firft infifted on.—' If a bud be torn from the branch of a tree, or cut out and planted in the earth with a glafs cup inverted over it, to prevent the exhalation from being at firft

greater

greater than its power of abſorption; or if it be inſerted into the bark of another tree, it will grow, and become a plant in every reſpect like its parent. This evinces that every bud of a tree is an individual vegetable being; and that a tree, therefore, is a family or ſwarm of individual plants, like the polypus, with its young growing out of its ſides, or like the branching cells of the coral-inſect.

2. ' When old oaks, or willows, loſe, by decay, almoſt all their ſolid internal wood, it frequently happens that a part of the ſhell of the ſtem continues to flouriſh with a few healthy branches; whence it appears, that no part of the tree is alive but the buds, and the bark, and the root-fibres; that the bark is only an intertexture of the caudexes of the numerous buds, as they paſs down to ſhoot their radicles into the earth; and that the ſolid timber of a tree ceaſes to be alive; and is then only of ſervice to ſupport the numerous family of buds in the air above the herbaceous vegetables in their vicinity.

' A bud of a tree, therefore, like a vegetable ariſing from a ſeed, conſiſts of three parts; the *plumula*, or leaf; the radicle, or root-fibres; and the part which joins theſe together, which is called the *caudex* by Linneus, when applied to intire plants; and may, therefore, be termed *caudex gemmæ*, when applied to buds.

' In herbaceous plants the caudex is generally a broad flat circular plate, from which the leaf ſtem aſcends into the air, and the radicles or root-fibres deſcend into the earth. Thus, the caudex of a plant of wheat lies between the ſtem and the radicles, at the baſis of the lowermoſt leaf, and occaſionally produces new ſtems and new radicles from its ſides. Thus the caudex of the tulip lies beneath the principal bulb, and generates new ſmaller bulbs in the boſom of each bulb-leaf, beſides one principal or central bulb; the caudex of orchis, and of ſome ranunculuſes, lies above their bulbous roots; whereas the caudexes of

the buds of trees conſtitute the longitudinal filaments of the bark, reaching from the plumula, or apex of the bud on the branch, to the baſe of it, or its root-fibres beneath the ſoil.

'Nor is this elongation of the caudexes of the buds of trees unanalogous to what happens to ſome herbaceous plants, as in wheat; when the grain is buried two or three inches below the ſoil, an elongation of the caudex occurs almoſt up to the ſurface, where another ſet of fibrous roots are protruded, and the upright ſtem commences. The ſame happens in tulip-roots when planted too deep in the earth, as I have witneſſed, and, I ſuppoſe, to thoſe of many other vegetables.

'This caudex of the buds of trees not only deſcends as above deſcribed, but alſo aſcends from each bud to that above it; as on the long ſhoots of vines, willows, and briars; in this reſpect reſembling the wires of ſtrawberries, and other creeping plants. Thus the caudex of perennial herbaceous plants conſiſts of a broad plate, buried beneath the ſoil to protect it from the froſt; while the caudex of buds of trees conſiſts of a long vaſcular cord extending from the bud on the branch to the radicle beneath the earth, and endures the winter froſts without injury.

3. 'Theſe buds are properly biennial plants, as they are generated in one ſummer, and in the next either produce ſeeds and die, or produce other buds, whoſe caudexes form a new bark over the former one, that of the laſt year firſt becoming a ſofter or more porous wood, called *alburnum*, or ſap-wood, and gradually hardening into ſolid timber, which ceaſes to poſſeſs vegetable life.

'Theſe long caudexes of the individual buds of trees, which conſtitute their bark, are well ſeen in the cloth made from the mulberry-bark brought from Otaheite. On the inſpecting this cloth, the long fibres are ſeen in ſome places to adhere, where it is probable they occaſionally inoſculate, like ſome of the

veſſels

veſſels in animal bodies; becauſe, when ſome buds are cut off, the neighbouring ones flouriſh with greater vigour, being ſupplied with more of the nutritious juices.

'This informs us why the upper lip of an horizontal wound in the bark of a tree grows downwards with ſo much greater expedition than the under one grows upwards to meet it; as the deſcending caudexes of the individual buds are ſupplied directly with nutriment from the vegetable arteries, after the oxygenation of the blood in their leaves; whereas the under lip of the wound is nouriſhed only by the lateral or inoſculating veſſels, which ſupplies us with another argument againſt the individuality of trees, and in favour of that of buds.

4. 'The buds producing flowers are each an individual being as well as the leaf buds above deſcribed, though they are probably not ſo eaſily capable of tranſplantation into the bark of other trees by inoculation; as, I believe, it is from the miſtake of the gardeners in chooſing flower-buds inſtead of leaf-buds to inoculate with, that ſo many buds die in this mode of propagation. Nor does the exiſtence of many male and female parts in one flower deſtroy its individuality any more than the number of paps of a ſow or bitch, or the number of their cotyledons, each of which, during geſtation, belongs to a ſeparate fetus.

'The flower-buds, as well as the leaf-buds, are properly biennial plants, as they are produced in the ſummer of one year, and periſh in the autumn of next; but as the new buds, generated by leaf buds, continue to adhere to the parent, they are furniſhed with their numerous caudexes, which form a new bark over the old one, whereas the flower-buds generate ſeeds, which, when mature, fall upon the ground; and thus they die in the autumn without increaſing the ſize of the parent tree by the adheſion of their progeny, like the leaf-buds.

 5. 'Theſe

5. ‘ These buds of plants, which are each an individual vegetable being, in many circumstances resemble individual animals; but as animal bodies are detached from the earth, and move from place to place in search of food, and take their food at considerable intervals of time, and prepare it for their nourishment within their own bodies, after it is taken, it is evident they must require many organs and powers which are not necessary to a stationary bud. As vegetables are immoveably fixed to the soil, from whence they draw their aliment ready prepared, and this uniformly, and not at returning intervals, it follows, that in examining their anatomy we are not to look for muscles of locomotion, as legs and arms; nor for organs to receive and prepare their aliment, as a mouth, throat, stomach, and bowels; by which contrivances, animals are enabled to live many hours without new supplies of food from without.

6. ‘ The parts, which we may expect to find in the anatomy of vegetables, which correspond to those in the animal economy, are, first, a three-fold system of absorbent vessels, one branch of which is designed to imbibe the nutritious moisture of the earth, as the lacteals imbibe the chyle from the stomach and intestines of animals; another to imbibe the water of the atmosphere, opening its mouths on the cuticle of the leaves and branches, like the cutaneous lymphatic vessels of animals; and a third to imbibe the secreted fluids from the internal cavities of the vegetable system, like the cellular lymphatics of animals.

‘ Secondly; in the vegetable fetus, as in seeds or buds, another system of absorbent vessels is to be expected, which may be termed umbilical vessels, which supply nutriment to the new bud or seed, similar to that of the albumen of the egg, or the *liquor amnii* of the uterus; and also another system of arterial vessels, which may be termed placental ones, corresponding with those of the animal fetus in the egg or in the

womb,

womb, which ſupply the blood of the embryon with due oxygenation before its nativity.

'Thirdly; a pulmonary ſyſtem correſpondent to the lungs of aerial animals, or to the gills of aquatic ones, by which the fluid abſorbed by the lacteals and lymphatics may be expoſed to the influence of the air. This is done by the leaves of plants, or the petals of flowers; thoſe in the air reſembling lungs, and thoſe in the water reſembling gills.

'Fourthly; an arterial ſyſtem to convey the fluid thus elaborated to the various glands of the vegetable, for the purpoſes of its growth, nutrition, and ſecretions; and a ſyſtem of veins, to bring back a part of the blood not thus expended.

'Fifthly; the various glands which ſeparate from the vegetable blood the honey, wax, gum, reſin, ſtarch, ſugar, and other ſecretions.

'Sixthly; the organs adapted to the lateral or viviparous generation of plants by buds, or to their ſexual or oviparous propagation by ſeeds.

'Seventhly; longitudinal muſcles to turn their leaves to the light, and to expand or to cloſe their petals or their calyxes; and vaſcular muſcles to perform the abſorption and circulation of their fluids, with their attendant nerves; and a brain, or common ſenſorium, belonging to each individual ſeed or bud; to each of which we ſhall appropriate an explanatory ſection.

7. 'An embryon bud, therefore, whether it be a leaf-bud or a flower-bud, is the viviparous offspring of an adult leaf-bud, and is as individual as a ſeed, which is its oviparous offspring. It conſiſts, firſt, of a central organization or caudex, like the corculum of a ſeed, which contains the rudiments of arteries, veins, abſorbent veſſels, and glands, with an internal pith, or brain.

'Secondly; it is furniſhed with a ſyſtem of umbilical veſſels, which are inſerted into the alburnum or ſap-wood of the tree, or form a part of it; and, deſcending into the earth, ſupply it in the early ſpring with its firſt

firſt nutrition, like the ſeminal roots, ſo called, which paſs from the corculum of the ſeed, and are ſpread on the cotyledons, as ſeen in the garden bean, in Dr. Grew's *Anatomy of Plants.*

'Thirdly; this umbilical ſyſtem probably contains alſo what may be termed a placental artery, terminating on the coats of the lateral air-veſſels, which penetrate the bark of trees horizontally, for the purpoſe of oxygenating the blood of the vegetable fetus, like thoſe diſtributed from the umbilical veſſels of the chick, or the air-bag, at the broad end of the egg.

'Fourthly; it contains the rudiments of organs adapted to lateral generation, or the production of new buds; or to ſexual propagation, and the conſequent production of ſeeds.

'In the early ſpring the umbilical veſſels ſupply the embryon buds of trees with ſap-juice, which is then ſeen to exude from wounds of the alburnum, as in the vine, *vitis;* the birch, *betula;* and the maple, *acer;* which I ſuppoſe to become oxygenated in the circulation of the vegetable fetus by the horizontal air-veſſels of the bark.

'As the ſeaſon advances, the leaf-bud puts forth a plumula, like a ſeed, which, ſtimulated by the oxygen of the atmoſphere, riſes upwards into leaves to acquire its adapted pabulum, which leaves conſtitute its lungs; it alſo protrudes from its long caudex, which forms the new bark over the old one, a radicle which, ſtimulated by moiſture, paſſes downwards, and deſcends into the earth to acquire its adapted pabulum; and it thus becomes an adult vegetable being with the power of producing new buds.

'The flower-bud, under ſimilar circumſtances, puts forth its bractes, or floral-leaves, which ſerve the office of lungs to the pericarp and calyx; and expands its petals, which ſerve the office of lungs to the anthers and ſtigmas, which are the ſexual organs of reproduction, and which die and fall off when the ſeed is impregnated; and thus, like the leaf-bud, it becomes

becomes an adult vegetable being, with the power of producing ſeeds.

'Eighthly; as the flower-bud produces many ſeeds during the ſummer, ſo the leaf-bud produces many budlets during the ſummer, as may be ſeen in the long ſhoots of the vine and willow, *vitis et ſalix.* In this climate, both the buds and ſeeds are properly biennial vegetables; that is, they are produced in one ſummer, and periſh in the next. But the ſeed differs from the bud in this circumſtance,—that it drops on the earth, and is thus ſeparated from its dead parent in the autumn; while the bud continues to adhere to its dead parent, and grows over it as it advances.

'Now, as the internal pith of a bud appears to contain or produce the living principle, like the brain and medulla oblongata, or ſpinal marrow of animals, we have from hence a certain criterion to diſtinguiſh one bud from another, or the parent bud from the numerous budlets which are its offspring, as *there is no communication of the internal pith between them.*'

The author then proceeds, in the ſecond ſection, to treat of the particular organs of plants ſeparately; and, firſt, of the abſorbent veſſels. The roots, leaves, bark, and ſap-wood, are ſhewn to abſorb by placing them in water, eſpecially if this is tinctured by the madder-root, or by dilute ink. Thus ſome twigs of a fig-tree, with leaves on them, were placed about an inch deep in a decoction of madder; on taking out theſe the following day, and cutting off from their bottom about an eighth of an inch of the ſtalk, an internal circle of red points appeared, while an external ring of arteries was ſeen to bleed out haſtily a milky juice, and at once evinced both the abſorbent and arterial ſyſtems. Theſe vegetable abſorbents differ from thoſe of animals in the facility with which they carry their fluids either way; for a forked branch of a tree torn from its trunk, and having one of its forks, with the leaves on it, inverted in a veſſel of water, will

will continue for ſeveral days unwithered, nearly as well as if the whole had been placed upright in the water. A willow rod on the ſame account will grow almoſt equally well, whether the apex or baſe of it be ſet in the ground.

The ſtructure of vegetable abſorbents, the author thinks, probably conſiſts of a ſpiral line, as appears on breaking almoſt any tender vegetable, and gradually extending ſome of the fibres, which adhere the longeſt. If ſuch be the ſtructure, it is eaſy to conceive how a vermicular or periſtaltic motion of the veſſel, each ſpiral ring ſucceſſively contracting itſelf till it fills up the tube, muſt forcibly puſh forwards its contents without the aid of valves.

'The abſorbent veſſels of vegetables, like thoſe of animal bodies, are liable to err in the ſelection of their proper aliment; and hence they ſometimes drink up poiſonous fluids, to the detriment or deſtruction of the plant. Dr. *Hales* put the end of a branch of an apple-tree, part of which was previouſly cut off, into a quart of rectified ſpirit of wine and camphor, which quantity the ſtem imbibed in three hours, which killed one half of the tree. *Vegetable Statics*, p. 13.

'Some years ago I ſprinkled on ſome branches of a wall-tree a very ſlight ſolution of arſenic, with intent to deſtroy inſects; but, at the ſame time, it deſtroyed the branches it was thrown upon: and I was informed by Mr. *Wedgewood*, that the fruit trees planted in his garden, near Newcaſtle in Staffordſhire, which conſiſted of an acid clay beneath the factitious ſoil, became unhealthy as ſoon as their roots penetrated the clay; and on inſpection it appeared, that the ſmall fibres of the roots, which had thus penetrated the clay, were dead and decayed, probably corroded by the vitriolic acid of the clay, beneath which is a bed of coals.'

Section 3. treats of the umbilical veſſels of ſeeds and buds. The ſeeds of vegetables are a ſexual offſpring correſponding with the eggs of animals, and contain,

contain, like them, not only the rudiment of the new organization, but alſo a quantity of aliment laid up for its early nouriſhment. They are both produced by the congreſs of male and female organs; the former ſupplying the ſpeck of animation, or cicatricula, in the egg, and the corculum, or heart, in the ſeed; and the latter producing the nidus, or neſt, for its reception, and the nutritive material for its ſupport. The umbilical veſſels paſs from the heart or corculum of the ſeed, which is the living embryon of the future plant, into the ſeed-lobes, commonly called cotyledons, and imbibe from thence a ſolution of the farinaceous or oily matter there depoſited for the nutriment of the new vegetable.

'The ſeeds of plants,' the author obſerves, 'are thus a ſexual or amatorial progeny, produced principally by the male flower, and received into a proper nidus, and ſupplied with nutriment by the female part of it, and which can thus claim a father and mother; but the buds of vegetables are a linear progeny, produced and nouriſhed by a father alone, to whom they adhere, not falling off like the ſeeds. For in this moſt ſimple line of reproduction, by the buds of trees, and by the bulbs of ſome plants, and by the wires of others, which are their viviparous progeny, the caudex of the leaf is the parent of the bud or bulb, or wire, which riſes in its boſom, according to the obſervation of Linneus.

'This linear or paternal progeny of vegetables in buds or bulbs, or wires, is attended with a very curious circumſtance; which is, that they exactly reſemble their parents, when they are arrived at their maturity, as is obſerved in grafting fruit trees, and in propagating flower-roots, or ſtrawberries, or potatoes, by their wires or roots; whereas the ſeminal offspring of plants, as it derives its form in part from the mother as well as father, is liable to perpetual variation, both which events are employed to great advantage by ſkilful gardeners.'

Buds

Buds and bulbs, like ſeeds, are furniſhed with umbilical veſſels, in which the ſap-juice riſes in the ſpring; this riſe of ſap is the reaſon why the bark is then eaſily ſeparated from the alburnum. What is called the dry-rot in timber, and which eſpecially takes place in timber that is felled in the ſpring, is owing to the fermentation of the ſugar contained in the ſap-juice.

The means by which vegetable abſorbent veſſels in their living ſtate imbibe the fluids of the earth and atmoſphere, and carry them forward with ſo much force, muſt be ſimilar to thoſe with which animal abſorbent veſſels perform the ſame office: that is, by their mouths being excited into action by the ſtimulus of the fluids which they abſorb, and not to capillary attraction, as ſome have ſuppoſed, as capillary attraction cannot make fluids flow over the tops of ſmall tubes, as the ſap-juice did in Dr. Hales vine-ſtump. This circumſtance is confirmed by the evident proofs of the irritability of plants in various other inſtances, as the cloſing and opening of the petals and calyxes of flowers by light and darkneſs, warmth and cold, dryneſs and moiſture, and by the motions of the leaves of mimoſa, or ſenſitive plant, and of dionœa muſcipula, by any mechanical ſtimulus. To this might be added, a variety of inſtances of the irritability to the ſtimulus of heat being increaſed after a previous expoſure to cold, exactly in the ſame manner as happens in animal bodies.

In the ſucceeding ſection the author treats of the pulmonary arteries and veins of vegetables. His object here is to prove that leaves are the lungs of vegetables, and not perſpiratory organs, as ſome have ſuppoſed, nor excretory nor nutritious organs, nor electric nor luminous ones, as others have believed. The analogy between the aërial and aquatic leaves of vegetables, and the lungs and gills of animals, embraces ſo many circumſtances, that we can ſcarcely, the author thinks, withhold our aſſent to their performing

ing ſimilar offices. 'The great ſurface of the leaves, compared to that of the trunk and branches of trees, is ſuch, that it would ſeem to be an organ well adapted for the purpoſe of expoſing the vegetable juices to the influence of the air. This, however, we ſhall ſee afterwards is probably performed by their upper ſurfaces, which are expoſed to the light as well as air, and on that account acquire greater oxygenation, as will be ſhewn hereafter: yet even in this caſe the upper ſurfaces of the leaves muſt bear a greater proportion to the ſurface of the bark of the tree, than that of the air-cells of the lungs of animals to their external ſurfaces.

'Aerial or aquatic animals, by their muſcular exertions, produce a current of air or water reciprocally to and from their lungs, and can occaſionally change the place where they reſpire, when the air or water becomes vitiated. But as vegetables have little muſcular power to move their leaves, except in a few inſtances, and as the air and water is frequently nearly ſtationary, where they exiſt, it ſeems to have been neceſſary to expoſe their fluids to the air or water on a greater expanſe of ſurface than in the lungs or gills of animals, which well accounts for the exuberant extent of their foliage.

'In the lungs of animals, the blood, after having been expoſed to the air in the extremities of the pulmonary artery, is changed in colour from deep red to bright ſcarlet, and is then collected and returned by the pulmonary vein. So in the leaves of plants the vegetable blood is rendered yellow in ſome plants, as in celandine, *chelidonium;* white in others, as in fig-leaves, *ficus;* and in ſpurge, *euphorbia;* and red in others, as in red beets, *beta.* And the ſtructure of the leaf, as conſiſting of arteries and veins to expoſe the vegetable blood to the influence of the air, and to return it to the caudex of the bud at the foot-ſtalk of the leaf, beautifully became viſible by the following experiment.

'A ſtalk

'A ſtalk, with the leaves and ſeed-veſſels of large ſpurge *(euphorbia helioſcopia)*, in June 1791, had been ſeveral days placed in a decoction of madder *(rubia tinctoria)*, ſo that the lower part of the ſtem, and two of the inferior leaves, were immerſed in it. After having waſhed the immerſed leaves in much clean water, I could readily diſcern the colour of th madder paſs along the middle rib of each leaf. This red artery was beautifully viſible, both in the under and upper ſurface of the leaf; but on the upper ſide many red branches were ſeen going from it to the extremities of the leaf, which on the other ſide were not viſible, except by looking through it againſt the light. On this under ſide a ſyſtem of branching veſſels, carrying a pale milky fluid, were ſeen coming from the extremities of the leaf, and covering the whole under ſide of it, and joining into two large veins, one on each ſide of the red artery in the middle rib of the leaf, and along with it deſcending to the foot-ſtalk or petiole. On ſlitting one of theſe leaves with ſciſſars, and having a common magnifying lens ready, the milky blood was ſeen oozing out of the returning vein on each ſide of the red artery in the middle rib, but none of the red fluid from the artery. All theſe appearances were more eaſily ſeen in a leaf of *picris* treated in the ſame manner; for in this milky plant the ſtems and middle rib of the leaves are ſometimes naturally coloured reddiſh; and hence the colour of the madder ſeemed to paſs further into the ramifications of their leaf-arteries, and was there beautifully viſible with the returning branches of milky veins on each ſide.

'In a plant which was ſent to me under the name of *ſenecio bicolor*, but which I have not yet ſeen in flower, the upper ſurface of the leaf is green, like moſt other leaves, but during the vernal months the under ſurface is of a deep red; whence I conclude, that the vegetable blood acquires the red colour in the terminations of the pulmonary artery in the upper

per ſurfaces of the leaves, which becomes viſible as it paſſes in the large veins on the inferior ſurface. In the ſame manner the red colour of the blood is moſt viſible in the large veins beneath the leaf of the red veined dock, *rumex ſanguinea.*'

From theſe experiments the upper ſurface of leaves would appear to be the immediate organ of reſpiration; and hence, if laid with this ſurface on water, they wither as ſoon as in the dry air, but continue green many days, if placed with their under ſurface on water. In like manner the author found, that by ſmearing with oil the ſurfaces of ſeveral leaves of phlomis, of Portugal laurel, and balſams, they all died in a day or two.

There exiſts a ſtrict analogy between the leaves of aquatic plants, and the gills of aquatic animals, which conſiſts in the largeneſs of their ſurface, owing to their hair-like ſubdiviſions, and their being terminated by innumerable points. The water-ranunculus, and ſome others, have frequently ſome leaves erect in the air, and others immerſed in water, ariſing from the ſame ſtem; and it is curious to obſerve, that the aerial leaves are nearly entire, whilſt the aquatic ones are ſlit into innumerable branches like fringe, and have thus their ſurfaces wonderfully enlarged for the purpoſe of acquiring uncombined oxygen from the air which is diffuſed in the water, and which abounds ſo much leſs there than in the atmoſphere.

Bractes, or floral-leaves, in like manner ſerve the office of lungs to the vegetable uterus, or pericarp, and to the ſeeds produced and retained in it, frequently before their impregnation, and always after it. There is ſtill another pulmonary ſyſtem totally independent of the green foliage, which belongs to the ſexual or amatorial parts of the fructification only, viz. the corol, or petals.

Section 5. treats of the aortal arteries and veins of vegetables. The arteries which carry their blood

 up

up the foot-ſtalks of the leaves, and expoſe it on the upper ſurface of them to the influence of the air through a thin moiſt pellicle, where it changes its colour, and returns by correſpondent veins, have been already mentioned. Theſe branching veins unite at the foot-ſtalk of each leaf into more or fewer trunks, as may be ſeen in tearing off the foot-ſtalk of a leaf of a cheſnut-tree from the ſtem; and there, without the interpoſition of a heart, like the circulation in the aorta of fiſh, and that in the liver of red-blooded animals, theſe venous trunks take the office of arteries, and diſperſe the blood downwards along the bark to the roots, and to every other part of the vegetable ſyſtem, performing the various purpoſes of ſecretion, excretion, and nutrition.

'A proof of the circulation of the juices of plants has been deduced,' the author obſerves, 'from the communication of white ſpots from a grafted ſcion to the whole of the tree in which it was ingrafted. Mr. *Fairchild* budded a paſſion-tree, whoſe leaves were ſpotted with yellow, into one which bears long fruit. The buds did not take; nevertheleſs, in a fortnight, yellow ſpots began to ſhew themſelves about three feet above the inoculation; and in a ſhort time afterwards, yellow ſpots appeared on a ſhoot which came out of the ground from another part of the plant. *Bradley on Gardening*, vol. 2. p. 129.

'And Mr. *Lawrence* obſerves, that the yellow-ſtriped jaſmine has afforded a demonſtration of the circulation of the juices in a tree: he inoculated, in Auguſt, the buds of a ſtriped jaſmine-tree into the branches of plain ones; and aſſerts, that he has ſeveral times experienced, that if the bud lives for two or three months, it will communicate its virtue or diſeaſe to the whole circumfluent ſap, and the tree will become entirely ſtriped. *Art of Gardening*, p. 66. Theſe are both of them important facts, as they are related from reſpectable authorities.

'And

'And I think I have myſelf obſerved, in two pear-trees about twenty years old, whoſe branches were much injured by canker, that, on grafting hardier pear-ſcions on their ſummits, they became healthier trees, which can only be explained from a better ſanguification produced in the leaves of the new buds.'

In our next Number we ſhall continue our analyſis of this highly ingenious and intereſting work.

ART. XXXVIII. *A Treatiſe on the Chemical Hiſtory and Medical Powers of ſome of the moſt celebrated Mineral Waters; with Practical Remarks on the Aqueous Regimen. To which are added, Obſervations on the Uſe of Cold and Warm Bathing. By* WILLIAM SAUNDERS, *M.D. F.R.S. Senior Phyſician to Guy's Hoſpital.* Octavo, 483 pages, price 8s. London, 1800. PHILLIPS.

IT will hardly be denied, that the ſubject of the Treatiſe before us owes no ſmall ſhare of its importance to the caprice and prejudices of mankind. The reputation enjoyed by various mineral ſprings not unfrequently has its foundation in circumſtances very foreign to their real medicinal powers. The phyſician has often buſied himſelf in a laboured inveſtigation of the chemical properties of ſprings, where the good effects which occaſionally follow their uſe were fairly aſcribable to local circumſtances of ſituation, climate, and ſoil, as well as to change of occupation and habits, and relaxation from the cuſtomary mental exertions. The beneficial effects, however, produced by many mineral waters, are obvious, and in moſt caſes unqueſtioned: at the ſame time, the explanation which has been given by different writers, with regard to the true ſource of their medical powers, has been widely different. The improvements in modern chemiſ-

try have removed much of this ambiguity, and enable us to refer their medical properties to their real origin.

In the prefent volume, the author, with much induftry and judgment, has collected the various facts relative to the compofition and virtues of the moft celebrated mineral waters of this country, and of feveral foreign ones which have attained a diftinguifhed character. Thefe accounts have been extracted from the various detached publications on the individual waters, and pains have been taken to reconcile or account for differences of refult, which fome times happen where more than one authority has been confulted.

The firft chapter treats of the chemical conftitution of water, and its powers under various combinations. On this head, it is prefumed, there is little that will appear new to our readers. We proceed, therefore, to the fecond chapter, relating to the foreign contents of mineral waters.

Although the chemical analyfis of mineral waters, from the improvements in chemical knowledge, is become a very complicated fubject, calling for the exercife of much fkill and induftry in the operator, as is manifeft in the much-laboured work of Mr. *Kirwan* on the fubject, which was noticed in our laft Review, yet, Dr. *Saunders* juftly obferves, the high degree of accuracy which the chemift would require is often much more than is neceffary for the purpofe of the phyfician, who is every day ufing, indifcriminately, various faline fubftances in a far greater quantity than that which is fufficient to conftitute a mineral water. He has thought it right, however, at the fame time that he dwells more particularly upon thofe fubftances which give fenfible and medical properties to the water with which they are united, to give a general account of all the foreign contents of the mineral waters that are ufed medicinally, along with their

habitudes

*habitudes** with different re-agents, and other circumſtances that form the baſis of chemical diſtinctions.

Of the ſubſtances which form the foreign contents of natural waters, ſeveral are gaſeous, or, more properly ſpeaking, they are ſimply liquid, when diſſolved in the water; but on expoſure to heat, or often merely to air, they readily ſeparate from this fluid, aſſume the form of gas, and mix undiſtinguiſhably with the atmoſphere. All the gaſeous contents of water are expelled by boiling for about ten minutes. The firſt of theſe to be mentioned is *common*, or *atmoſpheric air*.

Water very readily diſſolves at a moderate temperature a ſmall portion of this air, but parts with it either at the boiling or freezing point. The ſame happens in part when the preſſure of the atmoſphere is removed by means of the air-pump. Moſt natural waters contain a ſmall quantity of common air, but ſeldom more than $\frac{1}{28}$ of their bulk. No particular teſt for aſcertaining its preſence has been ſuggeſted, except ſulphat of iron, which is thereby decompoſed, and a brown oxyd of iron gradually depoſited; whereas the ſolution of this ſalt in diſtilled water remains clear.

2. *Carbonic acid gas*, or *fixed air*. Water, at a moderate temperature, will readily take up its own bulk of this gas. Thus acidulated, it is capable of diſſolving ſeveral earths, eſpecially lime and magneſia, and a few metals, of which iron is the only one that is met with in the medical ſprings. The teſts for this acid, when diſſolved in water, are lime-water, litmus tincture, and ſometimes the ſtronger mineral acids. The lime is immediately precipitated out of lime-water, in the form of chalk, by the carbonic acid, but an exceſs of it re-diſſolves the lime; and, therefore, to apply this

* Can this term be applied with propriety to inanimate matter? Are the properties of ſuch ever influenced by habit?

teſt, the lime-water ſhould be in equal quantity with the acidulated water.

3. *Hydrogen gas*, or *inflammable air*. This gas is by itſelf ſcarcely ſoluble in water, and is never procured alone from any mineral water, but is ſometimes, the author obſerves, found united with the carbonic acid, forming the *carbonated hydrogen*, or *heavy inflammable air*.*

4. *Sulphated hydrogen gas*, or *hepatic air*. This conſiſts of ſulphur held in ſolution by hydrogen gas; and is found copiouſly in all thoſe natural waters which emit that peculiar offenſive odour, that has been compared to the ſmell of rotten eggs, or rather to the ſcourings of a foul gun-barrel. This air is produced naturally by the decompoſition of pyrites, and may readily be procured by pouring any of the mineral acids on alkaline or calcareous liver of ſulphur. Water impregnated with this air has a ſweetiſh taſte; it ſlightly reddens litmus, but does not affect lime-water. It precipitates of a reddiſh brown, which afterwards turns black, the metals out of various metallic ſolutions, eſpecially thoſe of lead, ſilver, and mercury, and blackens the ſurface of reguline ſilver or mercury, when they have been immerſed for ſeveral hours. It forms a yellow precipitate with the ſolutions of arſenic. The ſulphur is precipitated from hepatic water by a few drops of ſtrong nitrous acid.

5. *Azotic gas*, or *phlogiſticated air*. This air is found combined in a few natural waters, but in ſmall quantity. It does not give any ſenſible properties to the water with which it is combined, nor is there any re-agent that we are acquainted with, which will indicate its preſence when diſſolved.

The next claſs of ſubſtances contained in mineral waters are Calcareous Salts. There are three of

* *Qu.*---Does not this conſiſt of *carbon* diſſolved in hydrogen gas?

of theſe, which are chiefly found in mineral waters, the *carbonat*, *ſulphat*, and *muriat*, of lime.

Carbonat of lime is one ſource of hardneſs in water, but is readily got rid of by boiling, which drives off the exceſs of carbonic acid, and thus cauſes the chalk to be precipitated: hence the earthy cruſt, or furr, on kettles in which hard water has been boiled for a number of times; hence, too, the petrifying quality of various ſprings. The teſts of carbonat of lime diſſolved in water are not quite deciſive, except recourſe be had to boiling the water, and examining the nature of the precipitate which is thereby produced. The moſt delicate re-agent for this earthy ſalt is Brazil wood, the bright red of which is by it changed to a blue; but the ſame change is produced by any alkali. Syrup of violets is likewiſe rendered green by this ſalt, as well as by alkalies.

Sulphat of lime is one of the earthy ſalts that are found in natural ſprings, and generally accompanies every ſaline ſubſtance, except where there is an exceſs of alkali. This ſalt is depoſited in gray ſcales by evaporation, but not by a ſimple boiling, as carbonate of lime is. It is not certainly detected by any ſingle teſt, but its component parts, lime, and the ſulphuric acid, may be aſcertained ſeparately by different re-agents. Every earthy ſalt will curdle ſoap; but when an inſipid water produces this effect, we may in general infer the preſence of ſulphat of lime; almoſt all other earthy ſalts having a very ſenſible taſte. Spirits of wine, which will precipitate every ſalt with the ſulphuric acid out of the water in which it is diſſolved, if ſufficiently concentrated, poſſeſſes this power to a remarkable extent with ſulphat of lime; for, as *Kirwan* obſerves, it will immediately precipitate one grain of this earthy ſalt out of 1000 grains, or about two ounces of water; and, therefore, this is a teſt of conſiderable delicacy.

Muriat of lime is found in a great variety of ſprings, eſpecially in the brine-ſpings. It is bitter

to the taſte, very ſoluble both in water and ſpirit of wine, and very deliqueſcent. Muriat of lime is not diſcoverable with certainty by any ſingle teſt.

In all the ſalts with the baſis of lime, this earth is precipitable from any combination by the *oxalic acid,* or acid of ſugar. This acid unites with the lime, and forms a compound, which being nearly inſoluble in water, falls to the bottom of the liquor; and by collecting, drying, and weighing this precipitate, the weight of the pure lime may be inferred. Lime is not precipitated from its acid ſolutions by pure ammonia, which is an important circumſtance in analyſis, as it is thereby diſtinguiſhable from magneſia and aluminous earth, which are both ſeparated from their acids by cauſtic volatile alkali. But the mild or carbonated ammonia will decompoſe all the earthy ſalts by double affinity, the alkali uniting with the acid of the earthy ſalt, and the carbonic acid with its earth; and as the cauſtic ammonia is highly diſpoſed to attract carbonic acid from the air, when uſed as a re-agent it ſhould be mixed in a phial with the ſolution to be examined, and cloſely corked.

Magnesian Salts. Magneſia is found in various waters, and united with the ſame acids as lime. It diſſolves, in the mild ſtate, in three hundred times its weight of water. Carbonated magneſia produces the ſame change upon Brazil wood and ſyrup of violets as carbonated lime.

Sulphat of magneſia, Epſom ſalt, or *bitter purging ſalt,* is not diſcoverable by any ſingle teſt. Lime-water will diſtinguiſh it from *ſulphat of ſoda,* or *Glauber's ſalt,* with which it is very commonly found united, by decompoſing the ſulphat of magneſia, but not the ſulphat of ſoda.

Muriat of magneſia is particularly contained in ſea-water, and is not diſcoverable by any ſingle teſt. In all the magneſian ſalts, this earth is precipitated by cauſtic ammonia, and thus diſtinguiſhed from lime.

It

It differs from aluminous earth, in the readineſs with which this decompoſition takes place, as well as in the eaſe with which the magneſian precipitate is ſoluble in cold dilute ſulphuric acid.

Aluminous Salts. Theſe are but rarely found in any mineral water. The *ſulphat of alumine*, or common alum, the one which chiefly occurs, poſſeſſes naturally an exceſs of acid; and, therefore, it ſhews with different re-agents the ſame appearances as an uncombined acid.

Alkalies. Of the three alkalies there is but one, the mineral, which is at all abundant in mineral waters, either in combination with a fixed acid, or with the carbonic. It is only in the latter caſe that it ſhews alkaline properties to the taſte, and with different re-agents. The alkalies, both pure and carbonated, will turn ſyrup of violets green, and Brazil wood purple, in which properties they are imitated by the carbonats of lime and magneſia: but the diſtinguiſhing teſt of an alkali, is, to turn the yellow of turmeric to an orange or brick-red, which the carbonated earths will not do.

The *carbonat of ammoniac*, or mild volatile alkali, is met with in a few ſprings only, and is ſuſpected to proceed from ſome decompoſed animal or vegetable matter. It is diſcovered, unleſs in very minute quantity, by its precipitating a ſolution of ſulphat of copper, and re-diſſolving the oxyd of copper into a blue liquor.

Alkaline Neutral Salts. There are only two of theſe that require notice here, as found in mineral waters; viz. the *ſulphat of ſoda*, or *Glauber's ſalt*, and *muriat of ſoda*, or common ſalt. Theſe are commonly diſtinguiſhable by the form of their cryſtals, but not by any ſingle teſt.

Iron.

Iron. This metal is, of all others, the one moſt frequently met with in mineral waters, and the moſt readily detected, even in very minute quantities. The waters containing this are characterized by a peculiar inky taſte. There are two ſolutions of iron which are met with in mineral waters; that in the carbonic, and that in the ſulphuric acid: ſometimes the ſame water holds both in ſolution.

The carbonic acid only acts on iron in the reguline ſtate, or when ſo ſlightly oxydated as to be ſtill magnetical. The carbonated chalybeates are in general perfectly clear when freſh from the ſpring; but the affinity of the carbonic acid is ſo ſmall, that they ſoon grow turbid when expoſed to the air, and gradually depoſit a fine ochre, carbonated oxyd of iron, which partly precipitates to the bottom of the veſſel in which the water is contained, and partly ſwims on the ſurface in the form of a fine irideſcent pellicle. The water is by this means entirely freed from every particle of iron, and will no longer indicate this metal by the moſt delicate teſts. This ſeparation likewiſe occurs, if the freſh water be kept in a bottle only half full, or careleſsly corked. The walls of every chalybeate well, and the channels through which the water flows, are alſo lined with the ſame oxyd, forming a very good indication of the nature of the ſpring. The ochre, when analyzed, is found to be compoſed of iron, oxygen, carbonic acid, and water. An artificial ſolution of iron in carbonic acid (firſt noticed by Mr. *Lane*, and which cleared up every doubt on this ſubject) may be very readily made, by agitating, for a few minutes, iron wire or filings in a bottle filled with water ſaturated with this acid gas; and this ſolution is a perfect imitation of moſt of the ſimple natural chalybeates. Cauſtic alkalies ſeparate the iron entirely, but the aerated alkalies re-diſſolve a part of the precipitated oxyd, as *Bergman* obſerves; and this exiſtence of carbonated iron and carbonated alkali in the ſame water are not incompatible. The carbonated chalybeates

beates are by far the moſt frequent, and the iron is readily diſcovered by the teſts of gall-nuts in any form, and by the pruſſiated lime, or alkalies.

The ſulphat of iron is not very unfrequent in mineral waters, though much leſs common than the laſt mentioned chalybeate. The ſolution of this ſalt acquires oxygen by expoſure to the atmoſphere; and the oxyd by this means becoming inſoluble, is precipitated in the form of a brown ochre. The preſence of the ſulphat of iron in any water is detected by its affording a purple or black precipitate with any ſolution, either watery or ſpirituous, of the gall-nut, or any other vegetable aſtringent. Alkalies or lime, united with the acid of Pruſſian blue, are likewiſe very delicate teſts of iron, by affording a blue precipitate when any aſcertainable quantity of this metal is preſent.

Copper. This metal is found in combination with the ſulphuric acid, in ſprings in the neighbourhood of mines; but they are of no importance in a medical point of view. The copper is indicated by forming a cupreous cruſt on a piece of bright-poliſhed iron that has been immerſed for ſome time in the water; or by receiving a beautiful blue purple colour from the addition of ammonia.

Bitumens have been ſuppoſed, but erroneouſly, to enter into the compoſition of ſome mineral waters.

Siliceous earth is ſometimes found in mineral waters, and may be detected by evaporating the water to dryneſs, and treating the reſiduum with water and different acids, till every thing is taken up that is ſoluble. What remains is ſilex, which is diſtinguiſhed by fuſing on the blow-pipe with carbonated ſoda into a perfect glaſs. It is of no importance in a medical view.

Having thus ſpoken of the uſual ſubſtances contained in mineral waters, and the means of detecting them,

them, the author proceeds to treat of the particular waters, not mineral, in common uſe; as diſtilled, rain, ice and ſnow, ſpring, river, and ſtagnant waters.—With reſpect to the *hardneſs* of water, ariſing from the preſence of earthy ſalts, ſimple boiling will ſoften thoſe whoſe hardneſs conſiſts in mere carbonated earths, eſpecially the calcareous. This, however, will not remove ſelenite, which requires, for its ſeparation, to be decompoſed by an alkali.

In the fourth chapter the author treats of particular mineral waters, noticing the moſt celebrated ſprings of our own country, and thoſe the waters of which are imported from foreign parts. The order followed is that of the degree of foreign impregnation, beginning with the moſt ſimple, and ending with the moſt compounded. The firſt noticed is the *Malvern* water, which ſtands at the head of the remarkably pure natural ſprings.

The Malvern water does not differ in taſte from pure good ſoft water. The foreign matter it contains is leſs than than that of any ſpring water which we uſe, ſcarcely exceeding, on the average, one grain in the gallon. The contents, as aſcertained by analyſis, are ſome carbonic acid, in an uncombined ſtate, capable of acting on iron, and of giving a little taſte to the water, but the exact quantity of which has not been aſcertained; a very ſmall portion of earth, either lime or magneſia, united with the carbonic and marine acids; and, perhaps, a little neutral alkaline ſalt.

This water is in much eſteem as an external application in ſcrophulous ſores, ophthalmia, and cutaneous eruptions. Internally, it is ſaid to be uſeful in painful affections of the kidneys and bladder, attended with purulent, bloody, or fetid urine; in hectic fever from ulcerated lungs; and in fiſtulas of long ſtanding. The ſenſible effects of this water are, ſometimes, ſlight nauſea, ſome degree of drowſineſs at times, vertigo, or ſlight pain in the head. Its action on the bowels is uncertain, though it decidedly increaſes the urinary diſcharge.

The

The *Briſtol* Hot-well ſpring is another inſtance of a remarkably pure water. It ſparkles much when poured into a glaſs. Its temperature does not exceed, on an average, 74°; and this does not ſenſibly vary in winter or ſummer. It ſhews the following appearances with the ſeveral re-agents:

The blue ſyrup of violets is ſlightly changed to a green, ſhewing the preſence of an uncombined alkali, or elſe an aerated earth.

The yellow of turmeric is not altered, ſhewing, therefore, the abſence of an alkali; and, by direct inference, that the change on the preceding teſt was produced by an aerated earth.

The red of Brazil wood, and the blue purple of litmus, are ſcarcely changed by the water, indicating that the carbonated earth is in very ſmall quantity.

The fixed and volatile carbonated alkalies produce a white precipitate, by decompoſing ſome earthy ſalt diſſolved in the water.

Pruſſian alkali and tincture of galls occaſion no change, ſhewing thereby the abſence of any kind of metallic ſalt.

The preſence of carbonic acid is detected, by cauſing an immediate milkineſs and white precipitate when lime-water is added.

The precipitate produced by acid of ſugar, added to this water, indicates the preſence of lime; muriat of barytes diſcovers ſulphuric acid; and nitrate of ſilver exhibits the muriatic acid.

Nothing of a ſulphureous nature appears by the delicate teſt of acetite of lead.

A further analyſis of Briſtol water, by ſlow evaporation to dryneſs, gave to Dr. *Carrick* the following contents in the wine gallon.

Of Muriated Magnesia......	7.25
Muriated Soda	4.00
Sulphated Soda	11.25
Selenite	11.75
Carbonated Lime........	13.50
	47.75

Total, $47\frac{3}{4}$ grains of solid contents.

During

During the evaporation, 33 cubic inches of air were expelled, which, when collected in its proper veſſels, and ſubjected to examination, were found to conſiſt of 30 inches of carbonic acid gas, and 3 inches of common air.

It appears, therefore, that a Wincheſter gallon (of 231 cubic inches) of Briſtol Hot-well water contains only 47¾ grains of ſolid contents, of which rather leſs than half are neutral ſalts with the baſis of ſoda, and the remainder are calcareous ſalts; but that it alſo holds in ſolution about $\frac{1}{7}$ to $\frac{1}{8}$ of its bulk of a gas, which is chiefly carbonic acid.

The Briſtol water, therefore, differs only from common ſprings in containing a quantity of carbonic acid; but this quantity is very ſmall, compared with many other mineral waters. Its ſenſible effects probably do not vary from thoſe of common water of an equal purity, and its medicinal ones appear to be very equivocal, even in pulmonary conſumption, where it is chiefly celebrated. The author, however, ſuppoſes it may tend to alleviate the moſt harraſſing ſymptoms of hectic fever.

The waters of *Matlock* and *Buxton* belong likewiſe to the claſs of pure waters, and require only a brief notice here. The former contains both cold and tepid ſprings, but the temperature of the tepid does not exceed 66°, and is thus the loweſt in temperature of the Engliſh thermal waters. It does not appear to contain an exceſs of carbonic acid.

The temperature of Buxton water is about 82°, and may therefore be called a warm ſpring, though ſlightly ſo. In ſenſible properties it cannot be diſtinguiſhed from common ſpring water heated to the ſame temperature. It differs in chemical properties only by holding in ſolution a ſmall quantity of azotic gas. Buxton water is much eſteemed as a bath in thoſe caſes in which a loſs of action, and ſometimes even of perfect ſenſation, has come on particular limbs, owing to long-continued or violent inflammation,

mation, or external injury, where the firſt increaſe of action is paſt. In chronic rheumatiſm it is particularly efficacious. Internally taken, this water is ſaid to be uſeful in indigeſtion ariſing from intemperance, and in calculous affections of the urinary paſſages.

The *Bath waters* are next noticed, and that at conſiderable length. Theſe waters are of a higher temperature than any in this kingdom, and indeed are the only natural waters we poſſeſs that are at all hot to the touch; all the other thermal waters being of a heat below the animal temperature, and only deſerving that appellation from being invariably warmer than the general average of the heat of common ſprings. The heat of the Bath waters at the pumps varies from 116° to 112°.

The foreign contents of theſe waters are by no means remarkable. They contain a good deal of calcareous ſalts, which render them hard, and unfit for domeſtic purpoſes. They hold in ſolution but little, if any, neutral alkaline ſalts: are in a very ſlight degree impregnated with carbonic acid; in a ſtill ſlighter with iron, and that only when hot from the ſpring, the carbonic acid ſoon flying off, and the iron being precipitated in the form of ochre. They likewiſe hold in ſolution a ſmall portion of ſiliceous earth.

There are few of the natural waters, Dr. *Saunders* obſerves, in which it is ſo difficult to ſeparate the effects of the mere liquid, joined to temperature, from thoſe of the foreign contents, that are found in the freſh drawn water. Indeed, this is in ſome degree impoſſible, becauſe the increaſed heat appears to give an activity and power to ſubſtances ſo minute in quantity, that they would probably paſs inactive through the circulation, were they taken cold. That much of the effect of Bath water is merely owing to its warmth can hardly be doubted, and there may be ſome conſtitutions, to whom this is the only effect, as well as ſome diſeaſes, which never require more

than

than this ſimple remedy; but there are other habits, and eſpecially the delicate and irritable, who feel ſtrongly the peculiar compoſition of this water, and with theſe it requires ſometimes conſiderable precaution in its uſe.

The Bath water, when drank freſh from the ſpring, has, in moſt perſons, the effect of raiſing, and rather accelerating the pulſe, increaſing the heat, and exciting the ſenſations. When the waters are likely to prove beneficial, they excite, on being firſt taken, a pleaſing glow in the ſtomach, to which ſoon ſucceed an increaſe of appetite and ſpirits, and a rapid determination to the kidnies. On the other hand, when they occaſion head-ache, thirſt, and dryneſs of the tongue, when they ſit heavy on the ſtomach, and produce ſickneſs, and do not paſs off by urine or perſpiration, their operation is unfavourable, and their further employment is not to be adviſed.

One of the moſt important uſes, however, of the Bath water, is, its external application; but its effects here do not appear to the author to differ in any reſpect from thoſe of common water, heated to the ſame temperature, and ſimilarly applied. Amongſt the principal diſorders relieved by Bath water is *chloroſis*: the languor of circulation and obſtruction of the natural evacuations, which conſtitute the leading features of this troubleſome complaint, are much relieved by its uſe as a warm bath.

The Bath water is likewiſe adapted to thoſe bilious diſeaſes, brought on by a reſidence in hot climates; to jaundice ariſing from a ſimple obſtruction of the gall-ducts; to anomalous gout, rheumatiſm, and paralyſis of the limbs, from different cauſes; and to hypochondriaſis, and various cutaneous complaints.

The author proceeds now to treat of what he terms *Simple Saline* waters, or ſuch as differ from common water only in being impregnated, more or leſs ſtrongly, with ſome neutral ſalt with either an alkaline or earthy

earthy bafis, that renders it purgative, when taken in fuch a dofe as the ftomach can bear, without being much incommoded by the mere bulk of liquid. Thefe ufually contain feveral falts, and are moftly cold, but fometimes warm. Under this head are comprehended the following: *Sedlitz*, or *Seydfchutz* water; *Epfom*, and many fimilar fprings near this metropolis; as thofe of *Acton*, *Kilburne*, *Bagnigge-wells*, and the *Dog and Duck*, or *St. George's Spa*; *Sea water*, *and Seltzer water*;—but the particulars of thefe we muft defer to a future Number.

(To be continued.)

Art. XXXIX. *A Series of Engravings, accompanied with Explanations, which are intended to illuftrate the Morbid Anatomy of fome of the moft important Parts of the Human Body. Fafciculus the Second*, price 12s.; *Fafciculus the Third*, price 14s.; *and Fafciculus the Fourth*, price 14s. *By* Matthew Baillie, *M.D. &c. &c.* London, 1799-1800. Johnson.

THE firft Fafciculus of this ingenious and ufeful work was noticed in the fixth volume of our Review. The fecond comprehends the chief morbid appearances of the lungs, and of the parts intimately connected with them. In the third part, the principal morbid appearances of the pharynx, the œfophagus, and ftomach, are pointed out.

The fourth Fafciculus comprehends the chief morbid appearances of the fmall and great inteftines, and contains nine plates. In the firft are exhibited the various effects of inflammation upon the outer furface of the inteftines, as adhefion, and the exfudation of coagulating lymph: it exhibits, alfo, fome fmall fcrophulous maffes upon the outer furface of the inteftines. The fecond plate exhibits the different appearances

of ulcers upon the inner furface of the inteftines; whilft the following one points out the morbid appearances obfervable in the great inteftines of perfons who have been carried off by that fatal fpecies of dyfentery which frequently prevails in camps.

In the fourth plate are reprefented the changes of ftructure belonging to fchirrus and cancer of the rectum: in the fifth, thofe which take place in *fiftula in ano,* and piles. The fixth reprefents a cafe of *intusfufceptio* in the jejunum; another of polypus, which had grown in the figmoid flexure of the colon; and an inftance of a membranous procefs, which had grown from original malformation in the cavity of the jejunum, and which refembled in its fhape a ring, or the valve of the pylorus.

The feventh plate illuftrates fome of the moft important circumftances relating to *Hernia.* In the following, the fame fubject is continued, and two uncommon fpecies of hernia are reprefented; viz. the hernia congenita, and the diaphragmatic hernia, or that where, from original malformation, the contents of the abdomen are forced into the cavity of the thorax, an inftance of which was quoted from Dr. *Clarke,* in our laft Number.

The laft plate in the prefent collection contains a reprefentation of the different fpecies of worms which are bred in the human inteftines; viz. the *lumbricus teres, afcaris, trichuris, tænia folium,* and *tænia lata.*

ART. XL. J. VAN HEEKEREN, *M.D. De Ofteogenefi Præternaturali. Cum Tabula Ænea.* Quarto, 125 pages, price Leyden, 1798. Imported by T. BOOSEY. London, 1800.

IN this ingenious Differtation, written for the purpofe of graduation, the author fets out with fhewing, that the hard, and apparently inorganic, fubftance of

of bone, is endued with a ſtructure analogous to that of the ſoft parts of the body, with ſimilar powers of circulation, growth, and regeneration; powers which are frequently in exceſs, occaſioning induration, tumour, and callus, all of which are treated of in ſucceſſion, and with conſiderable ability.

The curious fact, reſpecting induration or increaſed ſolidity in bones, that this change takes place chiefly in the middle of the long bones, and the bones of the cranium, whilſt the ſpongy ones, as the bodies of the vertebræ, and the ſpongy extremities of the long bones, become caſed or incruſted, but never indurated, is endeavoured to be accounted for on the greater proportional ſupply of abſorbent veſſels in theſe laſt, or from their greater action. Hence, too, ulceration more readily takes place in the ſpongy bones, than in thoſe of a more compact ſtructure.

With reſpect to the too luxuriant growth of callus, the author obſerves, that this takes place much leſs frequently than is commonly ſuppoſed; but he allows that it may occaſionally occur in caſes where Nature is diſturbed in the progreſs of her work by unuſual irritation. Callus, likewiſe, may be too ſparingly generated, where the powers of reproduction are deficient from any cauſe: but in neither caſe does he ſuppoſe the efforts of Art to be of any avail, unleſs by the removal of the general or topical diſeaſe which occaſions the luxuriancy or defect.

The ſtructure and growth of cartilage are afterwards explained, and its induration and converſion into bone, in various parts of the body, the effect of age or diſeaſe. The ſame change, alſo, the author obſerves, very frequently takes place in membranous parts, as in the containing membranes of the brain and other organs; in the coats of arteries and veins; and in the valves of the heart itſelf, particularly in advanced age.

Upon the whole, with reſpect to oſſifications in membranous parts, the author obſerves, that the diſ-

poſition to this is favoured by age, or that condition of the ſyſtem which diſpoſes to indurations in general; and that the veſſels of membranes, in ſuch a ſtate, acquire a condition analogous to thoſe of bone. This change does not, however, take place at once, but by ſlow degrees; the part about to oſſify firſt becoming hard, by the depoſition of a cartilaginous matter, which is again abſorbed, and, at length, bone is depoſited. Nature here, as on all other occaſions, follows fixed laws, always acting in a certain and determinate mode.

A well-engraved Table ſerves to illuſtrate the principles laid down in the work.

ART. XLI. *Reſearches, Chemical and Philoſophical; chiefly concerning Nitrous Oxide, or Dephlogiſticated Nitrous Air, and its Reſpiration. By* HUMPHRY DAVY, *Superintendent of the Medical Pneumatic Inſtitution.* Octavo, 580 pages, price 10s. London, 1800. JOHNSON.

THE very extraordinary effects produced by the reſpiration of the dephlogiſticated nitrous air or nitrous oxide, as it will now be termed, as related in Dr. Beddoes's '*Notice of Obſervations, &c.*'* rendered it a ſubject of much curioſity, and one that promiſed important reſults in its inveſtigation. In the work before us, Mr. *Davy* has beſtowed uncommon pains on the inquiry into its chemical hiſtory and production, as well as its effects on the human body by reſpiration. The experiments here detailed are entitled to the more attention, as the ingenious author ſeems to have been aware of, and to have cautiouſly guarded againſt, every circumſtance, however minute, which tended in any way to influence the reſult. By extend-

* An account of this work was given in our laſt vol. page 454.

extending his reſearches to the different ſubſtances connected with nitrous oxide, *nitrous acid, nitrous gas,* and *ammoniac,* he has been able to reconcile the want of coincidence in various writers who have treated on the ſubject, and has given a tolerably clear hiſtory of the combinations of oxygene and nitrogene *(azote).*

The firſt Reſearch relates to the analyſis of nitrous gas and nitrous acid, and to the production of nitrous oxide. In this he has, for the moſt part, repeated the experiments of other chemiſts, but has been enabled, by cloſe attention, and the aid of improved apparatus, to make more minute obſervations concerning phenomena, and ſometimes to draw different concluſions.

With reſpect to the compoſition of nitrous acid, it appears, from the experiments made to determine this, 1. That 100 cubic inches, ſuch as exiſts in the aëriform ſtate, ſaturated with oxygene, at temperature 55°, and atmoſpheric preſſure 30.1, weigh 75.17 grains.—2. That 100 grains of it are compoſed of 68.06 nitrous gas, and 31.94 oxygene, or of 29.9 nitrogene, and 70.1 oxygene.—3. That 100 grains of pale green ſolution of nitrous acid in water, of ſpecific gravity 1.301, is compoſed of 50.62 water, and 49.38 acid of the above compoſition.—4. The ſame quantity of the deep yellow acid are compoſed of 91.9 nitrous acid, and 8.1 of water.—5. 100 grains of pale *nitric* acid conſiſt of 91.55 true acid, and 8.45 of water.

The following Table ſhews the proportions of oxygene and nitrogene in nitric and nitrous acids.

100 Parts.		Oxgene.	Nitrogene		Nitrogene	Oxygene.
Nitric acid	Contain	70.50	29.50	Proportions. Nitrogene. Unity.	1	2.389
Bright yellow nitrous .		70.10	29.90		1	2.344
Orange coloured		69.63	30.37		1	2.292
Dark green		69.08	30.92		1	2.230

An obfervation is made, by a friend of the author's, Mr. *James Thompfon*, refpecting the compofition of nitrous acid, which deferves notice; which is, that it ought not to be confidered as a diftinct and lefs oxygenated ftate of acid, but fimply as nitric or pale acid, holding in folution, that is, loofely combined with, nitrous gas; and that the falts called *nitrites* are in reality ternary combinations, fimilar to the triple compounds compofed of fulphuric acid, metallic oxides, and nitrous gas. In proportion as the nitric acid abforbs nitrous gas, it changes colour, becoming, firft, ftraw-coloured, then pale yellow, and, laftly, bright yellow: it lofes in fpecific gravity during this procefs. In proportion, too, as the nitrous acids contain more nitrous gas, fo in proportion do they more readily give it out. From the blue-green acid it is liberated flowly at the temperature of 50°, and from the green, likewife, on agitation. The orange-coloured and yellow acids do not require a heat above 200° to free them entirely of their nitrous gas; and all the coloured acids, when expofed to the atmofphere, abforb oxygene, and become, by degrees, pale. Suppofing this theory, therefore, to be well founded, there is no diftinct acid to which the term *nitrous acid* ought to be applied, fince this is merely an union of nitrous gas with the nitric acid.

The fecond divifion of this *Refearch* contains experiments and obfervations on the compofition of *ammoniac*, and on its combinations with water and nitric acid. On a comparifon of the experiments of *Berthollet*, *Prieftley*, and others, with thofe of the author, it appears, that 100 grains of *ammoniac* are compofed of about 80 nitrogene, and 20 hydrogene. The union of the nitric acid with ammonia, forming nitrate of ammonia, is the falt from which the nitrous oxide is immediately and moft advantageoufly prepared. The preparation of this forms the fubject of the following divifion.

Nitrate

Nitrate of ammoniac exifts in two different forms, the difference arifing from the quantities of water contained in them: the prifmatic nitrate of ammoniac, containing its full quantity of water of cryftallization; and the compact nitrate, either amorphous, or compofed of delicately-needled cryftals, containing but little more water than exifts in nitric acid and ammoniac.

The decompofition of nitrate of ammoniac has been faid to take place at different temperatures by different chemifts. From a number of experiments made by the author, it appears, that

1ft. Compact, or dry, nitrate of ammoniac, undergoes little or no change at temperatures below 260°.

2dly At temperatures between 275° and 300°, it flowly fublimes; without decompofition, or without becoming fluid.

3dly. At 320° it becomes fluid, decompofes, and ftill flowly fublimes; it neither affuming, or continuing in, the fluid ftate, without decompofition.

4thly. At temperatures between 340° and 480°, it decompofes rapidly.

5thly. The prifmatic and fibrous nitrates of ammoniac become fluid at temperatures below 300°, and undergo ebullition at temperatures between 360° and 400°, without decompofition.

6thly. They are capable of being heated to 430° without decompofition, or fublimation, till a certain quantity of their water is evaporated.

7thly. At temperatures above 450° they undergo decompofition, without previoufly lofing their water of cryftallization.

The production of refpirable nitrous oxide was thus effected: 200 grains of compact nitrate of ammoniac were introduced into a glafs retort, and decompofed flowly by the heat of a fpirit lamp, fo that the heat employed did not exceed 440°. The firft portions of the gas that came over were rejected, and the laft re-

 ceived

ceived in jars containing mercury. No luminous appearance was perceived in the retort during the procefs, and almoft the whole of the falt was refolved into fluid and gas. The fluid had a faint acid tafte, and contained fome undecompounded nitrate. The gas collected exhibited the following properties.—

A candle burnt in it with a brilliant flame, and crackling noife. Before its extinction, the white inner flame became furrounded with an exterior blue one.

Phofphorus, introduced into it in a ftate of inflammation, burnt with infinitely greater vividnefs than before.

Sulphur introduced into it, when burning with a feeble blue flame, was inftantly extinguifhed; but when in a ftate of active inflammation (that is, forming fulphuric acid), it burnt with a beautiful and vivid rofe-coloured flame.

Inflamed charcoal, deprived of hydrogene, introduced into it, burnt with much greater vividnefs than in the atmofphere.

To fome fine twifted iron wire a fmall piece of cork was affixed: this was inflamed, and the whole introduced into a jar of the air. The iron burned with great vividnefs, and threw out bright fparks as in oxygene.

30 meafures of it expofed to water previoufly boiled, was rapidly abforbed; when the diminution was complete, rather more than a meafure remained.

Pure water faturated with it, gave it out again on ebullition, and the gas thus produced retained all its former properties.

It was abforbed by red cabbage juice; but no alteration of colour took place.

Its tafte was diftinctly fweet, and its odour flight, but agreeable.

It underwent no diminution when mingled with oxygene or nitrous gas.

The

The refidual gas that remained after abforption by water, was found to be air previoufly contained in the water which in no cafe can be perfectly freed from it by ebullition), and liberated by the ftronger attraction of that fluid for nitrous oxide. In afcertaining, therefore, the purity of nitrous oxide from its abforption by water, corrections ought to be made for the quantity of gas expelled from the water: this quantity in common water diftilled under mercury being about $\frac{1}{50}$; in water fimply boiled, and ufed when hot, about $\frac{1}{36}$; and in common fpring water, $1\frac{1}{12}$.

The fpecific gravity of nitrous oxide appears to be greater than that of atmofpheric air; 100 cubic inches of it weighing 50.1 grains at temperature 50°, and atmofpheric preffure 37. One hundred grains of nitrous oxide were found to confift of about 37 oxygene, and 63 nitrogene; exifting in a much more condenfed ftate than when in their fimple forms. When nitrate of ammoniac is decompofed at high temperatures, as of 600°, and above, inftead of yielding nitrous oxide, it is wholly refolved into water, nitrous acid, nitrous gas, and nitrogene; whilft a vivid luminous appearance is produced.

The author enters into a very minute inveftigation of the nitrous oxide, and of the fubftances immediately connected with it, which is well worthy the attention of the chemical philofopher: the nature of our undertaking, however, requires us to confine ourfelves to thofe parts which more immediately relate to its medical adminiftration. The following remarks occur, on the preparation of nitrous oxide for refpiration.

'When compact nitrate of ammoniac is flowly decompofed, the nitrous oxide produced is almoft immediately fit for refpiration; but as one part of the falt begins to decompofe before the other is rendered fluid, a confiderable lofs is produced by fublimation.

'For

'For the production of large quantities of nitrous oxide, fibrous nitrate of ammoniac should be employed. This salt undergoes no decomposition till the greater part of its water is evaporated, and in consequence, at the commencement of that process, is uniformly heated.

'The gas produced from fibrous nitrate, must be suffered to rest at least for an hour after its generation. At the end of this time it is generally fit for respiration. If examined before, it will be found to contain more or less of a white vapour, which has a disagreeable acidulous taste, and strongly irritates the fauces and lungs. This vapour, most probably, consists of acid nitrate of ammoniac and water, which were dissolved by the gas at the temperature of its production, and afterwards slowly precipitated.

'It is found in less quantity when compact nitrate is employed, because more salt is sublimed in this process, which being rapidly precipitated, carries with it the acid and water.

'Whatever salt is employed, the last portions of gas produced, generally contain less vapour, and may in consequence be respired sooner than the first.

'The nitrate of ammoniac should never be decomposed in a metallic vessel,* nor the gas produced suffered to come in contact with any metallic surface; for in this case the free nitric acid will be decomposed, and, in consequence, a certain quantity of nitrous gas produced.

'The apparatus that has been generally employed in the medical pneumatic institution, for the production of nitrous oxide, consists

'1. Of a glass retort, of the capacity of two or three quarts orificed at the top, and furnished with a ground stopper.

'2. Of a glass tube, conical, for the purpose of receiving the neck of the retort; about ,4 inches wide

'* Except it be gold or platina.'

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in the narroweft part, 4 feet long, curved at the extremity, fo as to be capable of introduction into an airholder, and inclofed by a tin plate to preferve it from injury.

' 3. Of airholders of Mr. Watt's invention, filled with water faturated with nitrous oxide.

' 4. Of a common air furnace, provided with dampers for the regulation of the heat.

' The retort, after the infertion of the falt, is connected with the tube, carefully luted, and expofed to the heat of the furnace, on a convenient ftand. The temperature is never fuffered to be above 500°. After the decompofition has proceeded for about a minute, fo that the gas evolved from the tube enlarges the flame of a taper, the curved end is inferted into the airholder, and the nitrous oxide preferved.

' The water thrown out of the airholders in confequence of the introduction of the gas, is preferved in a veffel adapted for the purpofe, and employed to fill them again; for if common water was to be employed in every experiment, a great lofs of gas would be produced from abforption.

' A pound of fibrous nitrate of ammoniac, decompofed at a heat not above 500°, produces nearly 5 cubic feet of gas; whilft from a pound of compact nitrate of ammoniac, rarely more than 4,25 cubic feet can be collected.

' For the production of nitrous oxide in quantities not exceeding 20 quarts, a mode ftill more fimple than that I have juft defcribed may be employed. The falt may be decompofed by the heat of an Argand's lamp, or a common fire, in a tubulated glafs retort, of 20 or 30 cubic inches in capacity, furnifhed with a long neck, curved at the extremity; and the gas received in fmall airholders.

' Thus, if the pleafurable effects, or medical properties, of the nitrous oxide, fhould ever make it an article of general requeft, it may be procured with much

much lefs time, labour, and expence,* than moft of the luxuries, or even neceffaries, of life.'

The next divifion contains experiments and obfervations on the compofition of nitrous gas, and on its abforption by different bodies. From thefe it appears, that 100 grains of nitrous gas contain 53.4 of oxygene, and 46.6 nitrogene. This gas is not decompofable by pure water, as fuppofed by *Humboldt*; the diminution which takes place by its being placed in contact with water, being owing to a fimple folution of it in that fluid. At the temperature of 212, nitrous gas is incapable of remaining in combination with water, but is again difengaged from it.

Divifion 5 relates to the production of nitrous oxide from nitrous gas and nitric acid, in different modes. Nitrous gas may be converted into nitrous oxide in two modes.

First, by the fimple abftraction of a portion of its oxygene, by bodies poffeffing a ftrong affinity for that principle, fuch as alkaline fulphites, muriate of tin, and dry fulphures.

Second, by the combination of a body with a portion both of its oxygene and nitrogene, fuch as hydrogene, when either in a nafcent form, or a peculiar ftate of combination. Each of thefe modes is particularly treated of. The nitrous oxide produced in thefe ways, is, however, feldom fufficiently pure for phyfiological experiments. There are no reafons, the author obferves, for fuppofing that nitrous oxide is formed in any of the proceffes of Nature; and the nice equilibrium of affinity by which it is conftituted, forbids us to hope for the power of compofing it from its fimple principles. We muft be content to pro-

'* A pound of nitrate of ammoniac cofts about 5s. 10d. This pound, properly decompofed, produces rather more than 34 moderate dofes of air; fo that the expence of a dofe is about 2d. What fluid ftimulus can be procured at fo cheap a rate?'

duce

duce it, either directly or indirectly, from the decompofition of nitric acid. And as in the decompofition of nitrate of ammoniac, not only all the nitrogene of the nitric acid enters into the compofition of the nitrous oxide produced, but likewife that of the ammoniac, this procefs is by far the cheapeft, as well as the moft expeditious.

In the fecond *Refearch*, the combinations and compofition of nitrous oxide are inveftigated, and an account given of its decompofition by moft combuftible bodies.

The folubility of nitrous oxide in water was known to its difcoverer, Dr. *Prieftley*. The tafte of the folution is diftinctly fweetifh; it is fofter than common water, and more agreeable to the palate. Water impregnated with this gas does not feem to produce any peculiar effect, as the author drank near three pints of it in a day without experiencing any alteration attributable to the nitrous oxide.

This Refearch is concluded by fome obfervations on the different combinations of oxygene and nitrogene; viz. atmofpheric air; nitrous oxide; nitrous gas; and nitric acid—Nitrous acid has been already faid to be a mixture of the two laft. Analyfis and fynthefis, the author obferves, clearly prove that oxygene and nitrogene conftitute the known ponderable matter of atmofpheric air, nitrous oxide, nitrous gas, and nitric acid.

That the oxygene and nitrogene of atmofpheric air exift in chemical union, appears almoft demonftrable from the following evidences.

1ft. The equable diffufion of oxygene and nitrogene through every part of the atmofphere, which can hardly be fuppofed to depend on any other caufe than an affinity between thefe principles.*

2dly.

* That attraction muft be called chemical, which enables bodies of different fpecific gravities to unite in fuch a manner as to produce a com-

2dly. The difference between the specific gravity of atmospheric air, and a mixture of 27 parts oxygene, and 73 nitrogene, as found by calculation; a difference apparently owing to expansion in consequence of combination.

3dly. The conversion of nitrous oxide into nitrous acid, and a gas analogous to common air, by ignition.

4thly. The solubility of atmospheric air undecompounded in water.

ATMOSPHERIC AIR, then, may be considered as the least intimate of the combinations of nitrogene and oxygene.

It is an elastic fluid, permanent at all known temperatures, consisting of ,73 nitrogene, and ,27 oxygene. It is decomposable at certain temperatures, by most of the bodies possessing affinity for oxygene. It is soluble in about thirty times its bulk of water, and, as far as we are acquainted with its affinities, incapable of combining with most of the simple and compound substances. 100 cubic inches of it weigh about 31 grains at 55° temperature, and 30 atmospheric pressure.

NITROUS OXIDE is a gas unalterable in its constitution, at temperatures below ignition, It is composed of oxygene and nitrogene, existing, *perhaps*, in the most intimate union which those substances are capable of assuming.* Its properties approach to those of acids. It is decomposable by the combusti-

a compound, in every part of which the constituents are found in the same proportions to each other. Atmospheric air, examined after having been at perfect rest in closed vessels for a great length of time, contains in every part the same proportions of oxygene and nitrogene; whereas if no affinity existed between these principles, following the laws of specific gravity, they ought to separate; the oxygene forming the inferior, the nitrogene the superior stratum.

The supposition of the *chemical* composition of atmospheric air, has been advanced by many philosophers. The two first evidences have been often noticed.

* For it is unalterable by those bodies which are capable of attracting oxygene from nitrous gas and nitrous acid, at common temperatures.

ble

ble bodies at very high temperatures, is ſoluble in double its volume of water, and in half its bulk of moſt of the inflammable fluids. It is combinable with the alkalies, and capable of forming with them peculiar ſalts. 100 grains of it are compoſed of about 63 nitrogene, and 37 oxygene. 100 cubic inches of it weigh 50 grains, at 55° temperature, and 30 atmoſpheric preſſure.

Nitrous Gas is compoſed of about ,56 oxygene, and ,44 nitrogene, in intimate union. It is ſoluble in twelve times its bulk of water, and is combinable with the acids, and certain metallic ſolutions; it is poſſeſſed of no acid properties, and is decompoſable by moſt of the bodies that attract oxygene ſtrongly, at high temperatures. 100 cubic inches of it weigh about 34 grains, at the mean temperature and preſſure.

Nitric Acid is a ſubſtance permanently aëriform at common temperatures, compoſed of about 1 nitrogene, to 2,3 oxygene. It is ſoluble to a great extent in water, and combinable with the alkalies, and nitrous gas. It is decompoſable by moſt of the combuſtible bodies, at certain temperatures. 100 cubic inches of it weigh, at the mean temperature and preſſure, nearly 76 grains.

The third *Reſearch* relates to the reſpiration of nitrous oxide, and other gaſes. A conſiderable number of intereſting experiments and remarks occur here, which we muſt reſerve for a future Number of our Review.

(To be continued.)

Art. XLII. *A Practical Inquiry into Diſordered Reſpiration; diſtinguiſhing the Species of Convulſive Aſthma, their Cauſes, and Indications of Cure.* *The*

The second Edition, corrected; with an Appendix. By Robert Bree, *M.D.* Octavo, 299 pages, price 5s. London, 1800. Robinsons.

THE ample account we gave of the former edition of this ingenious work* renders it unnecessary to notice the present at any considerable length. We shall merely, therefore, point out the new matter it contains, and which is confined to the Appendix.

Having remarked, that he has had further experience of the advantage of following the directions contained in the preceding Essay, the author recapitulates the principal facts and inferences on which he endeavoured to establish his distinction of four species of convulsive asthma; viz. the mucous; the dry; that from irritation in the stomach or abdomen; and that, the recurrence of which depends on habit: but for these we must refer to our former account. The distinction of the species is next insisted on, as materially affecting the practice. On the treatment many judicious remarks occur, which receive confirmation from several subjoined cases.

Of the four species, the second is the only one that has been overcome, by plan or accident, within the author's observation; though material relief has been afforded in all. This general want of success he attributes to the almost entire neglect of the intermissions, partly owing to the limited views of the disease hitherto taken by practitioners, and partly to the circumstance of asthmatics permitting attendance only in the paroxysm.

In the second species, the dry, opium is the remedy which has been chiefly found beneficial.—' But in the first species,' the author observes, ' the lungs may be gorged with lymph, as frequently happens in Asthmatics who have taken cold. Here the exhibition of

* *See* Med. and Chir. Rev. vol. 4, p. 530; and vol. 5, p. 26.

opium

opium cannot be reckoned generally safe, till expectoration is free, when it may abate the re-action, which often continues strong after the bulk of the fluid has been removed. In the same intention as opium, ardent spirit may be useful. In the third species it has been taken during the state of indigestion, and with advantage. It may excite the feeble stomach to contract, and thus remove one obstacle to free respiration, in cases where opium would not answer: but diluting the contents of the stomach with repeated draughts of cold water, has a better effect, and is a more innocent custom. But the practice should not be confined to these limits. If iron and bitters, with the means before recommended, be used in the intermissions, the paroxysms will not only be more distant, but the stomach and lungs will contain less of the causes of irritation.

'After the first delay of the paroxysm, it generally happens, that the next return is more violent; a circumstance which the patient should be prepared for. We may hence infer, that the muscles are strengthened, and capable of more action. The convulsions of an hysterical female are generally vigorous, in proportion as she is athletic; and the force of a paroxysm of asthma may be estimated by the same rule. There is also a proof that some progress is made in the cure; for, as the intermissions encrease in length, we approach nearer to the object in view. Antispasmodics may be then used with greater freedom, and tonics with less.'

The use of tonics in the intervals is highly spoken of, and especially the *rubigo ferri,* or oxyd of iron. This the author considers as a remedy of such value, that, if it were new, or could be disguised in a new name, it would, he thinks, obtain a general sanction, and the credit of being specific; not for the cure of a paroxysm of asthma, but of asthma itself. With respect to its mode of action, he is inclined to suppose,

 that

that oxygen is evolved, much to the benefit of the habit; and that, poſſibly, the evolution is promoted by ~~giving~~ vitriolic acid at the ſame time.

Cinchona, he thinks, is leſs adapted to the weakneſs that appears in aſthma, than any preparation of iron accompanied by bitters or not. His objections to blood-letting remain in full force. As there is no real danger from the paroxyſm, he is of opinion that temporary relief is not worth purchaſing at the expenſe of delaying a cure.

In the preſent edition of his work, Dr. Bree has ſpared much of the diffuſeneſs which characterized the former. By loſing in bulk, it has, perhaps, acquired in point of real value.

ART. XLIII. 1. *Diſſertatio de Febribus Intermittentibus Præcipue Medendis. Auctore* HENRICO XAVIER BAETA, *Luſitano.* Edinburgh, 1800.
2. *Diſſertatio Medica Inauguralis de Typho. Auctore* HENRICO XAVIER BAETA. Edinburgh, 1800.

WE ſhould, probably, not have had to notice the above Diſſertations, but for their being attended with unuſual circumſtances; as mentioned by the author in his Preface, and in a note which accompanied the work. The Diſſertation on Intermittent Fevers is founded on the doctrines of Dr. *Darwin*, and is drawn up with conſiderable ability. But it ſeems, if we may credit the author, that the Profeſſors of Edinburgh refuſed to admit it as a ſpecimen for graduation, merely becauſe it was a commentary on the doctrine of Dr. *Darwin*; the Dean of the Faculty of Medicine obſerving, at the ſame time,—' That it would not fail to diſgrace the Univerſity.'—So little with

with the eye of favour is the celebrated *Zoonomia* looked on at that famous Seminary!

The Dissertation on Typhus, therefore, was substituted, and the solicited degree obtained accordingly.—We entirely agree with the author, in his estimate of the merits of this latter treatise, when he says,—'If it does not disgrace him, it at least adds nothing to his reputation.'

Art. XLIV. *Memorials on the Medical Department of the Naval Service, transmitted to the Lords Commissioners of the Admiralty; to which is annexed, an Address to Parliament on the Expedience of amending the Laws relative to the Exportation of Corn. By* William Renwick, *Surgeon in the Royal Navy.* Octavo, 32 pages, price 1s. London, 1800. Longman and Rees.

ALTHOUGH the situation of Navy Surgeons has received some amelioration during the present war, it is still wholly unworthy the rank and services of this respectable class of men. Parsimony, in this respect, is surely the highest impolicy, and must tend at length to prevent the department being filled by persons properly educated and qualified. Fifty pounds a year, the author justly observes, as a final acquisition, can have no allurement, where qualification is so expensive, and the respectability of profession so eventually degraded: yet such is the highest attainment within their reach; except what few will live to receive, and what is, therefore, considered as of no estimation.

Art. XLV. *A Letter to* Thomas Keate, *Esq. Surgeon-General to the Army, &c.; with some general*

neral Remarks on the Medical Profeſſion, occaſioned by the approaching Election of a Surgeon to St. George's Hoſpital, vacant by the Reſignation of Charles Hawkins, *Eſq. on the 9th of April,* 1800. Octavo, 32 pages, price 1s. London, 1800. Hurst.

NOTHING can be more true than the remark of the author of this pamphlet, viz. that the election of the medical officers to hoſpitals and diſpenſaries is uſually conducted by cabals: the majority of the electors being incapable of judging of the merit of the candidates, conſequently give their votes to thoſe who have the moſt powerful intereſt, or the greateſt number of friends,—not to thoſe who have the beſt title from profeſſional talents and induſtry. The election, he thinks, might be better conducted by a ſelect committee of profeſſional and literary characters: of this, indeed, there can be little doubt. It would not then be in the power of the candidate, as at preſent, to ſecure his election on too many occaſions by the mere purchaſe of votes. The privilege of voting is, no doubt, a powerful inducement with many to ſubſcribe; and there is reaſon to fear, that the withholding this privilege might injure the intereſts of the inſtitution: yet this is a trifling evil in compariſon with the appointment of inefficient or unſkilful officers; by which the very object and intention of the charity are defeated.

Art. XLVI. *Catalogue Raiſonnee des Ouvrages, &c.*: i. e. *Deſcriptive Catalogue of the Works which have been publiſhed on Mineral Waters in general, and of thoſe of France in particular; with a Table of the different Degrees of Temperature of thoſe which are Thermal, or Warm: publiſhed by deſire of*

of the late Royal Society of Medicine. *By* J. B. F. CARRERE. Quarto, 400 pages, price 6 franks. Paris, 1799.

THIS Catalogue, or rather learned and vaſt compendium, is divided into four parts; the firſt of which treats of mineral waters in general, and contains the titles and analyſes of two hundred and fifty-two different works on the ſubject. In the ſecond part, the author treats of the particular mineral waters which France furniſhes: an analyſis of nine hundred and two publications is here given, together with a notice of ſix hundred and twenty-ſeven different mineral ſprings.

The third diviſion of the work preſents a ſuccinct Table of thoſe mineral waters of France which have not hitherto been noticed by writers, and which amount to no leſs than four hundred and forty-ſeven. The laſt part contains a Table of the temperatures of the warm ſprings found in that country.

With reſpect to the merits of this laborious undertaking, it will ſuffice to ſtate, that, on the report of the celebrated Phyſician, M. *Vicq. d'Azyr,* it was in contemplation, previous to the Revolution, to print it at the charge of the *Royal Society of Medicine.*

ART. XLVII. *Elements of Chemiſtry and Natural Hiſtory; to which is prefixed, the Philoſophy of Chemiſtry.* *By* A. F. FOURCROY. *Fifth Edition, with Notes.* *By* JOHN THOMPSON, *Surgeon, Edinburgh.* Royal Octavo, 3 vols. price 1*l.* 11*s.* 6*d.* London, 1800. LONGMAN and REES.

THE celebrated work of M. *Fourcroy* here announced, is too well known to chemical readers to need particular notice from us. The preſent edition is rendered more valuable than the preceding

ones, by the addition of the *Philoſophy of Chemiſtry*, a work of late publication. The Tranſlator's notes, likewiſe, ſtamp additional value on the work, as containing the later improvements in chemical ſcience, together with frequent references to the beſt modern authors.

Art. XLVIII. *Pharmaciæ Elementa, Chemiæ recentioris fundamento innixa. Auctore* Francisco Carbonell. *Med. and Phil. D. at Barcelona.* Madrid, 1800.

A FREQUENT cauſe of difficulty in the ſtudy of the ſciences is the want of proper elementary Treatiſes; which by preſenting thoſe ſciences in their moſt ſimple ſtate, enable us at once to meaſure their extent, and to calculate whether the obſtacles which we have to overcome are ſuperior or not to the efforts we have in our power to make. But the compoſition of an elementary treatiſe is a work of no ſmall difficulty: it is not only neceſſary that ſuch an undertaking be a brief tranſcript of the ſcience of which it treats; it muſt alſo be ſimple and methodical, containing definitions at once conciſe and exact, and executed in a manner capable of attracting thoſe for whom it is deſtined.

The work before us is divided into ſeven chapters. The firſt contains preliminary and general remarks on the ſcience of pharmacy, which the author defines 'the ſcience that teaches the compoſition of medicines.' He divides it into the theoretical and the practical parts: the object of the firſt is, the indication of the precepts of the art; and of the ſecond their application to actual uſe.

The ſecond chapter treats of the general compoſition of medicines, which are divided into three claſſes: the ſimple, the prepared, and compound. The third

chapter

chapter treats of the knowledge and choice of fimple drugs: the fourth of the mode of collecting, exficcation and duration of drugs, and of the proper methods of preferving them. In the fifth chapter, the pharmaceutical operations in general are treated of; under this head are included all the various proceffes employed in the preparation of medicines, or in giving them new and original properties. The fixth treats of officinal pharmaceutic products, or fuch as are ready kept in the fhops for ufe; whilft the feventh and laft is devoted to magiftral preparations, or fuch as are prepared at the time of prefcription.

Although there are probably at prefent few practitioners in pharmacy who are altogether unacquainted with the doctrines and language of modern chemiftry, yet thefe have not hitherto been generally adopted in elementary treatifes on the fubject. The prefent work, therefore, is likely to prove ufeful in fupplying this deficiency.

Art. XLIX. *Recherches fur l'Influence de l'Air dans le Developement, le Caractere, et le Traitement des Maladies, &c.:* i. e. *Refearches on the Influence of the Air in the Developement, Character, and Treatment of Difeafes; a work in which it is propofed to eftablifh on the received Principles of Natural Philofophy and Chemiftry, and on thofe of Medical Obfervation, the Relation that exifts between the Atmofpherical and Nofological Conftitutions. By* L. D. A. Bouffey, *M.D. Phyfician at Argenton.* Price 2 franks, 25 cents. Paris, 1800.

IN the commencement of the work here noticed the author points out to the phyfician the neceffity of paying a fedulous attention to the viciffitudes of the atmofphere; not merely at particular times and feafons, as when peftilence and epidemical difeafes pre-

vail, but conftantly, and on all occafions. Obfervations of this kind, he fuggefts, fhould be frequently and regularly made, both with regard to the phyfical ftate of the air and weather, and alfo to the reigning maladies, and the refult carefully recorded for future reference.

The phyfical qualities of the atmofphere are next treated of, and its compofition and chemical nature explained; its ftate of moifture, agitation by winds, &c. Having confidered the air in itfelf, the author paffes to the examination of its influence in the animal economy, through the medium of the lungs and furface of the body. He cautions us againft an implicit adoption of the modern theories on the fubject of refpiration, and which he confiders as explaining partially only this important function, and the production of animal heat. According to the prevailing theory, the lungs continually throw out carbon and hydrogen. The oxygen of the atmofphere, which enters the bronchial tubes, uniting, on the one hand, with the carbon, forms the carbonic acid; and, on the other, with the hydrogen, forms water, both of which are carried off in expiration, along with the azot of the atmofpherical air, and a certain quantity of caloric fet at liberty from the oxygen air. The remainder of the caloric furnifhed by the oxygen gas, enters the blood together with the remaining oxygen, and this, in the courfe of circulation, uniting with the carbon and hydrogen it encounters in its rout, continually gives out its caloric along the fides of the veffels. Such is the fuppofed origin of animal heat; but M. *Bouffey* conceives this as inadequate to account for all the phenomena. The heat of the body in a febrile ftate; that which arifes in many local affections; from friction, &c.; give reafon to fufpect another fource of heat in animal bodies, than this theory prefents to us.

ART.

Art. L. *The Hoſpital Pupil; or, an Eſſay intended to facilitate the Study of Medicine and Surgery: in four Letters.* By James Parkinson. 12mo. 159 pages. Price 3s. 6d. London. 1800. Symonds, &c.

THE little Work before us is calculated to afford uſeful inſtruction to parents, in the diſpoſal of their ſons in the world; and, at the ſame time, to ſtimulate the induſtry of youth, by holding out to them how much their ſucceſs in life depends on their own exertions. In the firſt Letter, the author treats of the qualifications neceſſary for a youth intended for the profeſſion of Medicine or Surgery. Not only claſſical attainments are here noticed, but pecuniary reſources alſo, profeſſional education not being attainable at a trifling expenſe.

The ſecond Letter treats of the education of a youth intended for the profeſſions of Phyſic and Surgery.—Many weighty objections are offered to the preſent mode by apprenticeſhip, and a plan of ſtudy propoſed in its ſtead. In the third Letter, the beſt means of obtaining inſtruction, by a pupil attending an Hoſpital in the cuſtomary mode, are conſidered. The great importance of practical anatomy is particularly inſiſted upon, and the inſufficiency of a ſingle ſeaſon to enable the ſtudent to purſue the various objects of his reſearch ſhewn.

The laſt Letter contains, Hints for the Conduct of a young man entering on the Duties of the Medical Profeſſion. The chief points on which his ſucceſs in buſineſs, for the moſt part, hinges, are here conſidered.

MISCEL-

MISCELLANEOUS.

PROFESSOR *Abildgaard*, of Copenhagen, has made ſeveral experiments on reſpiration which lead to reſults very oppoſite to the prevailing notions on the ſubject. According to theſe, the quantity of air taken in at each inſpiration does not exceed three cubic inches, a quantity merely ſufficient to fill the aſpera arteria. From this it would appear that, at every inſpiration, the air contained in the windpipe only, can be renewed, whilſt that contained in the cells of the lungs muſt be very ſlowly changed and replaced by freſh air. This experiment is ſtrangely in contradiction to others that have been made on the ſame ſubject. Mr. *Menzies* ſuppoſed the quantity of air inſpired at once, to amount to 43 cubic inches; and the experiments of Dr. Goodwin and others, gave a nearly ſimilar reſult. This great difference ſhews there muſt have been ſome inaccuracy on one ſide or the other, and calls for a further careful inveſtigation.

2. Experience ſhews, M. Abildgaard obſerves, that the retention of the breath cauſes the ſame uneaſineſs and inconveniencies after inſpiration as after expiration; though, from theory, it ſhould be eaſier to retain the breath after inſpiration.

3. He opened the wind-pipe in two dogs, and by a convenient apparatus, injected azotic gas into the lungs of one, and oxygen gas into thoſe of the other; and after the lungs ſeemed thereby perfectly extended, a ligature was applied to the trachea in each. Both dogs felt the ſame painful ſenſation in the attempt of gaſping for breath, and there was no difference perceived, except that the latter lived eleven minutes, whereas the former died in five. The movement of the heart ſtill remained for ſome time viſible in both,

after

after the breathing had ceased. Professor *Abildgaard* now asks, why both animals attempted to breathe with equal sensations of pain and uneasiness, though one of them had the most salubrious air in the lungs? and why did they die before the movement of the heart, and consequently the circulation, had ceased? 4. It has been observed, by repeated experiments, that animals in a state of asphyxia, and brought to life again by air being injected into their lungs, did not take breath before the heart began to beat; if, therefore, the motion of the heart ceases from want of oxygen, why does it beat, in this case, before breathing is re-established? 5. Air drawn from the lungs of a dog killed by passing a ligature round the wind-pipe, was found to contain a portion of oxygen, which seems contrary to the common opinion of the use of this gas.—These, no doubt, are difficulties in the way of the common theory not easily to be removed. The immediate manner in which the stoppage of respiration occasions death, we are still ignorant of.

M. M. *Vauquelin* and *Buniva* have lately made a comparative analysis of the *liquor amnii* of the woman, and of the cow; and have likewise examined chemically the substance found adhering to the bodies of new-born children. The *liquor amnii* of the woman was found to contain *albumine* (coagulable lymph), *soda*, *muriate of soda* (sea-salt), and *phosphate of lime*. The crust found on the bodies of infants appears to be a degeneration of the albuminous substance, beginning to pass to the state of fat. The liquor amnii of the cow, exhibited a particular animal matter, a new acid, and sulphate of soda. These various substances are susceptible of alterations by disease, the nature of which the authors are engaged in investigating.

Infants are sometimes born having a portion of their viscera exposed, and forming a tumour which is termed

termed umbilical hernia. M. *Laſſus* accounts for this mal-conformation, from the circumſtance of the liver receiving more than its proper quantity of blood by the umbilical vein, and becoming enlarged in conſequence, ſeparates the abdominal muſcles which retain it in its ſituation, dilates and attenuates the tendinous ſubſtance which unites them, and makes its way outwards, by the ſame opening that ſerves for the paſſage of the umbilical cord. The inteſtines, and even the heart and lungs themſelves, M. *Laſſus* obſerves, are ſometimes thus expoſed, in conſequence of deranged organization. It is rarely, he ſays, that they admit of relief by art, but are generally fatal.

M. *Portal*, on the ſubject of ſerous apoplexy, recurs to an opinion given by him ſeveral years back, reſpecting the nature and treatment of that affection. He obſerves, that diſſection has always ſhewn effuſion in theſe caſes, or at leaſt congeſtion of blood in the brain, equally as in other ſpecies of apoplexy. He ſtrongly, therefore, recommends blood-letting in every caſe, a mode of practice which his experience has confirmed the propriety of.

M. *Tourdes*, the Tranſlator of ſome of *Spallanzani*'s works into the French language, in his notes accompanying the tranſlation, makes a phyſiological obſervation, which, if well founded, is of conſiderable importance. Having conſidered the influence of the nervous and ſanguineous ſyſtems on vitality, he remarks, that ſuch is the influence of the heart on the brain, that its vicinity to, or diſtance from, the head, determines the ſagacity and induſtry of animals; ſo that they are more ſtupid and limited in their faculties, in proportion as the neck is long, and, in conſequence, the heart further removed from the brain, and vice verſa. This law appears to the author to be applicable to the human ſpecies. It is ſeldom, in effect, he obſerves, that perſons, whoſe narrow and lengthened cheſt ſup-

ports

ports a long and ſlender neck, are diſtinguiſhed in ſcience; and it may at leaſt be aſſerted, that the moſt celebrated philoſophers have, in general, the neck very ſhort, ſo that their head repoſes, as it were, on their ſhoulders: and they commonly die of apoplexy.— The exceptions to this notion of M. *Tourdes,* we apprehend, will be found very numerous.

We lately laid before our readers ſome curious facts relating to Galvanic Electricity, and which ſeemed to prove ſatisfactorily the identity of this with common electricity.* Since that time a number of intereſting experiments have been made by Mr. *Carliſle,* and Mr. *Nicholſon,* author of the *Philoſophical Journal,* a few of which we ſhall now notice. The apparatus, we have ſeen, conſiſted of alternate ſeries of plates of zinc, ſilver, and wetted paſteboard, Mr. *Nicholſon,* having obſerved a diſengagement of gas to take place around the conducting wire, and which ſeemed to have the ſmell of hydrogen when the wire of communication was ſteel, he propoſed to aſcertain whether it were really ſo, by breaking the circuit, by the ſubſtitution of a tube of water between two wires. Accordingly, a braſs wire through each of two corks was inſerted at the oppoſite ends of a glaſs tube about half an inch in diameter, filled between the corks with water: the diſtance between the points of the wires in the water, was about an inch and three quarters.

This compound diſcharger was applied ſo that the external ends of its wire were in contact with the two extreme plates of a pile of 36 half crowns with the correſpondent pieces of zinc and paſteboard. A fine ſtream of minute bubbles immediately began to flow from the point of the lower wire in the tube, which communicated with the ſilver, and the oppoſite point

* *Vide* page 96 of the preſent volume, where we erroneouſly aſſigned the diſcovery of thoſe curious phenomena to Mr. *Carliſle*; it having originated with M. *Volta,* to whom we are indebted for a great number of intereſting facts on the ſubject.

of

of the upper wire became tarnished, first deep orange, and then black. On reversing the tube, the gas came from the other point, which was now lowest, while the upper, in its turn, became tarnished and black. Reversing the tube again, the phenomena again changed their order. In this way a sufficient quantity of gas was obtained, to afford an explosion when mixed with an equal quantity of common air. In whatever way the series of plates was commenced, whether with the silver or zinc, the gas always came from the wire communicating with the silver.

Thus it appears that the water was decomposed, as by the common electric fluid; and when tincture of *litmus* was employed in the tube instead of water, it was changed to a red colour, shewing either that an acid was formed, or that a portion of the oxygen combined with the litmus, so as to produce the effect of an acid. It was found, likewise, that when the intermediate paste-boards were moistened with salt and water, the salt was decomposed, the soda forming an efflorescence round the edges of the pile. The electric spark in these experiments, was even rendered visible in the dark. Similar experiments were made by Mr. *Cruickshank*, Mr. *Davy*, and others, and with nearly the same result; all of them tending to prove the identity of the electric and Galvanic fluids.

A number of interesting experiments on the same subject, have been made by Dr. *Moyes*, as communicated in a letter to Dr. *Garthshore*, and published in the *Phil. Mag.* for September last. From these it appears, that silver, or a non-oxydable metal, is by no means essential to the excitation of the Galvanic power, a column, consisting of copper, zinc, and paste-board, being as powerful as an equal column of silver, zinc, and paste-board. When moistened alumine was used instead of paste-board, the shocks given were remarkably stronger than when paste-board was employed.—Hence a probability that the Galvanic power may sometimes occur among the strata of the earth; and hence,

hence, Dr. *M.* obſerves, a new theory of earthquakes will in all probability ere long appear.

That the moon and planets exerciſe a certain influence (excluſive of the more evident effects of the ſun) on the ſtate of the globe we inhabit, appears to have been the opinion of mankind from the moſt remote antiquity. The dependence of the tides on the moon's changes, has been well aſcertained; but the effects of this planet on the atmoſphere has not been ſo well obſerved. Some obſervations relative to this ſubject have lately been made by *Luke Howard,* Eſq. and read before a Philoſophical Society, and which are of an intereſting nature. This gentleman found, by his own obſervation, and by an examination of different regiſters for a number of years back, that the atmoſphere is ſubject to a periodical change of gravity, whereby the barometer, on a mean of ten years, is depreſſed at leaſt one-tenth of an inch, while the moon is paſſing from the quarters to the full and new; and elevated, in the ſame proportion, during the return to the quarters. Theſe changes he attributes to the attraction of the ſun and moon for the matter compoſing the atmoſphere; the joint-attraction of the ſun and moon at the *new moon,* and the attraction of the moon predominating over the ſun's weaker attraction *at the full,* tending to depreſs the barometer, by taking off from the gravity of the atmoſphere, in the ſame manner that they produce a high tide in the waters, by taking off from their gravity: and again, the attraction of the moon being diminiſhed by that of the ſun at her quarters, this diminution tends to make a high barometer, together with a low tide, by permitting each fluid to preſs with additional gravity upon the earth.

Mr. *Howard* endeavours to obviate an objection to this ſuppoſition, on the ground, that diurnal tides of the atmoſphere have not been generally obſerved, and

and which ought to be moſt apparent, as in the caſe of the waters, by referring to the different conſtitutions of the two fluids, in point of temperature, compoſition, and elaſticity, &c. which he conceives to be ſufficient to account for the differences obſerved. In *Calcutta*, where the range of the barometer is at all times inconſiderable, and where the weekly lunar influence can ſcarcely be traced, a manifeſt regular daily tide has been detected by the diligent obſervations of Dr. *Balfour* (*Aſiatic Reſearches*), and which took place as follows, during the month of April:—beginning from ſix in the morning, the barometer roſe for four hours, then fell during eight hours; then roſe four hours, and fell eight again: this took place daily, and, with very little exception, uninterruptedly.—Theſe facts deſerve much attention, in order to aſcertain them with certainty, in a phyſiological and pathological point of view, to which their relation is ſufficiently apparent.

M. *B. G. Sage, Director of the Firſt School of Mines* in France, makes ſome obſervations on the tranſition of animal or abſorbing earth to the ſtate of calcareous earth,* which merit notice, though conveyed in language that is now, for the moſt part, obſolete.

The aſhes produced by burnt bones, he remarks, are white, and compoſed of more than two-thirds of animal earth, and of a part of that ſame earth combined with phoſphoric acid. They produce, by lixiviation, a pretty large quantity of natron, from which the fire, according to all appearance, has ſeparated the phoſphoric acid. Bone-aſhes ought to be conſidered as a phoſphoric ſalt with an exceſs of animal earth.

‘* Calcareous earth differs from that of bones in being compoſed of *acidum pingue*, and an exceſs of animal earth. Calcination reduces it to lime: but this is not the caſe with the earth of bones, which is a phoſphoric ſalt with exceſs of animal earth. The name of *phoſphate of lime*, given to the earth of bones, is conſequently improper.’

earth. The aſhes, deprived of their natron by lixiviation, are inſipid, and inſoluble in water; but the phoſphoric ſalt becomes ſoluble, if it be diſengaged from the exceſs of animal earth with which it is combined, and which may be effected by means of the vitriolic acid. Fourteen parts of this acid, concentrated, are requiſite for twenty-four of bone-aſhes: the more they are calcined to whiteneſs, the larger will be the quantity of vitrifiable phoſphoric acid extracted from them. It is contained in them in the proportion of a third. This ſalt, compoſed of animal earth and phoſphoric acid, may be decompoſed by fixed alkali, which precipitates from it an inſoluble calcareous phoſphorous ſalt. This character of inſolubility ſerves to ſhow, that there is a difference between the animal earth and the calcareous earth, ſince the phoſphoric acid ſalt, with a baſe of animal earth, is ſoluble in water. When vitrified, it produces a pellucid maſs of a light blue tint, while the phoſphoric ſalt with a calcareous baſe, produces by fuſion a ſemi-tranſparent white glaſs, cryſtallized at its ſurface into a kind of dendrites.

Six ounces of vitrifiable phoſphoric acid ſalt, dried into a ſoft paſte, required four ounces of fixed alkali of tartar to be decompoſed. The white precipitate, waſhed and dried, weighed one ounce ſix drams.

The leys, when evaporated, produced three ounces five drams of phoſphoric tartar. This ſalt, when expoſed to heat in a crucible, liquefies, ſwells up, and becomes fuſed. If it be poured on a plate of iron, it has the tranſparency of glaſs as long as it is warm, but becomes white and opaque on cooling. This ſalt, when fuſed, is ſapid, and ſoluble in water: it loſes by fuſion three eighths of its water of cryſtallization.

In the decompoſition of the vitrifiable phoſphoric acid ſalt by fixed alkali, more than half of the alkali is decompoſed; ſince there are obtained no more than three ounces five drams of phoſphoric tartar, which contain three-eighths of water.

The portion of *acidum pingue*, the principle of the fixed alkali, which modifies itſelf into mephitic acid gas, is very ſmall. This *acidum pingue* combines with the animal earth, and conſtitutes calcareous earth, which ſaturates itſelf with phoſphoric acid, and forms the inſoluble ſalt above-mentioned.

Profeſſor *Calliſen*, of *Copenhagen*, read lately before the Royal Medical Society, a paper, in which he endeavoured to ſhew, that the external uſe of boiling water, in caſes of internal inflammation, produces a much ſpeedier and more efficacious effect than veſicatories.

M. *Brugnatelli* conſiders *Light* as capable of uniting itſelf with bodies in three ways: firſt, chemically; ſecondly, being accumulated and mixed in them in a mechanical manner, but inviſible; and thirdly, accumulated in bodies in a viſible ſtate.

Light, chemically united with bodies, ſeparates itſelf from them in conſequence of its affinity for caloric. A red heat, however, is not neceſſary to diſengage light when in this ſtate: the black calx of manganeſe ſhines with great vivacity, when thrown upon a very hot, but not ignited, plate of iron. The caſe is the ſame with many other ſubſtances. In regard to bodies in which light is merely accumulated mechanically, nothing is neceſſary to render it free but an approximation of their parts. In this manner the light is, as it were, ſqueezed out; as is the caſe with the quickſilver in the barometer when it becomes luminous, vitriolated tartar, and other ſalts, which ſhine at the moment when they cryſtallize.

Light is accumulated in a viſible ſtate in the ſo called light magnets, which, when they have been expoſed for a conſiderable time to the light, imbibe a certain quantity of it, and then throw it out in the dark. Of theſe bodies, thoſe which deſerve the firſt place are, the *diamond*, *blende*, and the *carbuncle*; *ſulphat*

ſulphat of barytes, or *Bologna* phoſphorus, with others. Animal and vegetable matters, as putrid fiſh, rotten wood, &c., ſhine in this manner; alſo individual parts of animals, as the eyes of the hyæna, and of cats, the glow-worm, &c.—On this part of the ſubject, many curious facts will be found in the former part of this Number.

The *Madrid Gazette* announces an extenſive work on the Veterinary Art, by Dr. *Sigiſmondo Malats,* a Director of the Royal Veterinary College of Madrid. It conſiſts of nine quarto volumes, and contains the moſt complete and methodical view of the ſcience which has hitherto appeared. The four firſt volumes are devoted wholly to anatomy and phyſiology. The fourth and fifth compriſe the materia medica, and treat of the pharmaceutic principles, and the knowledge and powers of ſimple remedies, as drawn from the three kingdoms: the ſixth treats of the therapeutical part, pointing out the method of applying medicines, both external and internal, to the cure of the various diſorders. In the ſeventh and eighth volumes a ſatisfactory account is given of the various diſeaſes to which horſes, black cattle, and ſheep, &c. are incident, the peculiar ſymptoms, and beſt method of cure. The ninth, and laſt volume, contains a conſiderable number of miſcellaneous obſervations on rural economy, on the influence of climate on the breed and qualities of horſes, and other domeſtic animals, and on the principal cauſes of epidemic and and endemic diſeaſes amongſt them.

The ſame Gazette contains an account of a monſtrous foetus, of which a woman was lately delivered, at Poza, near Burgos, in Spain. It conſiſted of two male bodies united from the navel to the head incluſively. The head is of a ſmaller ſize than uſual, and contains three eyes, two ears, and two mouths: there were three arms and hands, one of which was provided with ſeven fingers, without a thumb.

This

This curious monſter was depoſited in the Royal Cabinet of Natural Hiſtory at Madrid.

From ſome experiments made by Mr. *Kirwan* to determine the nature and compoſition of different kinds of bitumens and pitcoal, it appears, that the following is the proportion and kind of ingredients in each ſpecies ſubmitted to examination. The quantity of carbon contained was aſcertained by finding the quantity requiſite to decompoſe or alkalize a certain given weight of nitre.

100 Parts.	Carbon.	Bitumen.	Ashes.	Specific Gravity.
Maltha } Bitumens	8	....	....	2,070
Asphalt } Bitumens	31	68	....	1,117
Kilkenny Coal.....	97,3	....	3,7	1,526
Compact Cannel...	75,2	21,68 Maltha	3,1	1,232
Slaty Cannel......	47,62	32,52 Maltha	20	1,426
Whitehaven.......	57	41,3 Mixt.	1,7	1,257
Wigan	61,73	36,7 Mixt.	1,57	1,268
Swansey	73,53	23,14 Mixt.	3,33	1,357
Leitrim	71,43	23,37 Mixt.	5,20	1,351
Newcastle	58	40 Mixt.	....	1,271

Moſt coals afford a volatile alkali by diſtillation: this, in Mr. *Kirwan*'s opinion, ſeems rather to be a product of the operation, ariſing from the union of hydrogen and mephitic air; and thus the alkaline baſis of the ammonias found on volcanos ſeem to have been formed. Coals alſo afford an acid, commonly the marine, or, if pyritous, the vitriolic alſo; more rarely the ſuccinous.

Correſpondence.

A *Conſtant Reader*'s ſuggeſtion will be attended to in our next Number.

In ſome points of view, *Philo Med.*'s plan appears an advantageous one: in others, the contrary. We have, however, no intention at preſent of adopting it.

THE

MEDICAL AND CHIRURGICAL

REVIEW.

JANUARY, 1801.

ART. LI. *Philoſophical Tranſactions of the Royal Society of London: for the Year* 1800. Part II. Price 14s. London, 1800. ELMSLY.

ART. 12. *On Double Images cauſed by Atmoſpherical Refraction: by* William Hyde Wollaſton, *M.D. F.R.S.*—In ſome of the laſt volumes of the Philoſophical Tranſactions there have been related many inſtances of ſtrong atmoſpherical refraction, by which objects ſeen near the horizon have appeared inverted, and the horizon itſelf either elevated or depreſſed. The purport of the preſent paper is, to inveſtigate the cauſes of terreſtrial refraction, which the author does, by examining theoretically the ſucceſſive variations of increaſing or decreaſing denſity to which fluids in general are liable, and the laws of the refractions occaſioned by them. 2. To illuſtrate and confirm the truth of the theory, by experiments with fluids of known denſity. And, laſtly, by trial upon the air itſelf, to aſcertain the cauſes and extent of thoſe variations of its refractive denſity, on which the

 inver-

inverfions of objects, and other phenomena obferved, appear to depend.

A number of ingenious experiments are related, in which fluids of different degrees of denfity were employed, and which explain, in a fatisfactory way, the phenomena above alluded to. Thus, when into a phial containing a fmall quantity of clear fyrup, an equal quantity of water was put, in fuch a way that it floated on the furface of the fyrup, without mixing with it; through the fyrup, a word written, on a card placed behind, was feen erect, and in its place; through the adjacent variable medium formed by the union of the two fluids, an inverted image was feen above the true place; and also, above that, a fecond image of the fame object appeared erect. When a fmall quantity of fpirit of wine was placed on the furface of the water, at the ftratum where the water and fpirit united, the appearances were the fame; but, fince the refractive power of fpirit exceeds that of water, the true place of the object was feen uppermost; the inverted and erect images were below.

By other experiments it appeared, that the variations of denfity, occafioned by difference of temperature between adjacent ftrata of the fame fluid, whether air or water, follow a fimilar law. In this way, it may readily be conceived, how the heated ftate of the air near the furface of the earth, and the evaporation from the furface of the fea, are capable of occafioning the phenomena which form the fubject of the prefent paper.

Art. 13. ' Inveftigation of the Powers of the Prismatic Colours to Heat and Illuminate Objects; with Remarks, that prove the different Refrangibility of Radiant Heat. To which is added, An Inquiry into the Method of Viewing the Sun advantageoufly, with Telefcopes of large Apertures and high Magnifying Powers:' by *William Herfchell*, L.L.D. &c.—In this highly curious paper, the author begins with a relation

relation of the circumstances which led him to surmise, that the power of heating and illuminating objects was not equally distributed among the variously coloured rays of light. In a variety of experiments he had occasionally made, relating to the method of viewing the sun, with large telescopes, to the best advantage, he used various combinations of differently coloured darkening glasses. What appeared remarkable was, that, when he used some of them, he felt a sensation of heat, though he had but little light; while others gave much light, with scarcely any sensation of heat. Now, as in these different combinations the sun's image was also differently coloured, it occurred to him, that the prismatic rays might have the power of heating bodies very unequally distributed among them; and, as he judged it right in this respect to entertain a doubt, it appeared equally proper to admit the same with regard to light. If certain colours should be more apt to occasion heat, others might, on the contrary, be more fit for vision, by possessing a superior illuminating power. At all events, it would be proper to recur to experiments for a decision.

The first experiments were made with the view of determining the heating powers of coloured rays. For this purpose, by means of a prism, the differently coloured rays were made to strike in succession on the blackened bulbs of very sensible thermometers, and the result was, on a mean of several trials, that the red rays rose the thermometer, in comparison with the violet coloured rays, in the ratio of 55 to 16; whilst the ratio of the red to the green was as 55 to 22.4: in other words, the heating power of the red rays, in comparison of the green, was as rather more than $2\frac{1}{4}$ to 1; and about $3\frac{1}{2}$ to 1 in comparison of the violet.

The next series of experiments related to the illuminating power of coloured rays. The microscope offered itself as the most convenient instrument for

 this

this investigation, the differently coloured rays being thrown on the object to be viewed, by means of the prism, as before. From these it appeared, that the red-making rays are very far from having the power of illuminating in any eminent degree. The orange possess more of it than the red; and the yellow rays illuminate objects still more. The maximum of illumination lies in the brightest yellow, or palest green. The green itself is nearly equally bright with the yellow; but, from the full deep green, the illuminating power decreases very sensibly. That of the blue is nearly upon a par with that of the red; the indigo has much less than the blue; and the violet is very deficient.

'These researches,' the author observes, 'ought to lead us on to others. May not the chemical properties of the prismatic colours be as different as those which relate to light and heat? Adequate methods for an investigation of them may easily be found; and we cannot too minutely enter into an analysis of light, which is the most subtle of all the active principles that are concerned in the mechanism of the operations of Nature. A better acquaintance with it may enable us to account for various facts that fall under our daily observation, but which have hitherto remained unexplained. If the power of heating, as we now see, be chiefly lodged in the red-making rays, it accounts for the comfortable warmth that is thrown out from a fire, when it is in the state of a red glow; and for the heat which is given by charcoal, coke, and balls of small-coal mixed up with clay, used in hot-houses; all which, it is well known, throw out red light. It also explains the reason why the yellow, green, blue, and purple flames of burning spirits mixed with salt, occasion so little heat, that a hand is not materially injured, when passed through their coruscations. If the chemical properties of colours also, when ascertained, should be such that an acid principle, for instance, which has been ascribed to light

light in general, on account of its changing the complexion of various ſubſtances expoſed to it, may reſide only in one of the colours, while others may prove to be differently inveſted, it will follow, that bodies may be variouſly affected by light, according as they imbibe and retain, or tranſmit and reflect, the different colours of which it is compoſed.'

Thus it appears, that radiant heat, as well as light, whether they be the ſame or different agents, is not only refrangible, but is alſo ſubject to the laws of the diſperſion ariſing from its different refrangibility. The author thinks it probable, that radiant heat conſiſts of particles of light of a certain range of momenta, and which range may extend a little further, on each ſide of refrangibility, than that of light. In a gradual expoſure of the thermometer to the rays of the priſmatic ſpectrum, we come to the maximum of light, long before we come to that of heat, which lies at the other extreme. By ſeveral experiments it appears, that the maximum of illumination has little more than half the heat of the full red rays; and from others it would ſeem, that the full red ſtill falls ſhort of the maximum of heat, which perhaps lies a little beyond viſible refraction. In this caſe radiant heat will at leaſt partly, if not chiefly, conſiſt of inviſible light, that is to ſay, of rays coming from the ſun, that have ſuch a momentum as to be unfit for viſion.

The author next makes an application of the reſult of theſe obſervations to the uſe of teleſcopes of large apertures and high magnifying powers. He found that red glaſſes, employed as darkening glaſſes for the purpoſe of tranſmitting a ſmaller quantity of light, though they intercepted light enough, yet occaſioned ſo much irritation to the eye by exciting a ſenſation of heat, that they could not not be uſed for the purpoſe. Green glaſſes, eſpecially when lightly ſmoked, at the ſame time that they tranſmitted more light, were free from the inconvenience of producing

a ſenſation of heat. A conſiderable number of experiments on this ſubject, made with variouſly coloured glaſſes, are related, but which we have not room to notice more particularly.

Art. 14. 'Experiments on the Refrangibility of the Inviſible Rays of the Sun:' by the ſame.—In the former paper it was inferred, that the range of the refrangibility of radiant heat was probably more extenſive than that of the priſmatic colours; this opinion is amply confirmed by the experiments here related. From theſe it appears, that there are rays coming from the ſun, which are leſs refrangible than any of thoſe which affect the ſight. They are inveſted with a high power of heating bodies, but with none of illuminating objects; and this explains the reaſon why they have hitherto eſcaped unnoticed. The bulb of the thermometer was expoſed to the differently coloured rays, ſeparated by the priſm, in the manner before-mentioned, and alſo to thoſe inviſible rays which fall on each ſide of the coloured ſpectrum. It was found that, at the diſtance of 52 inches from the priſm, there was ſtill a conſiderable heating power exerted by the inviſible rays, one inch and a half beyond the red ones, and their efficacy might probably be traced ſtill ſomewhat further. It appeared alſo, that the power of heating is extended to the utmoſt limits of the viſible violet rays, but not beyond them; and that it is gradually impaired as the rays grow more refrangible.

It was clearly proved, that the maximum of the heating power is veſted among the inviſible rays, and is probably not leſs than half an inch beyond the laſt viſible ones, when projected in the manner before-mentioned. The ſame experiments alſo ſhew, that the ſun's inviſible rays, in their leſs refrangible ſtate, and conſiderably beyond the maximum, ſtill exert a heating power fully equal to that of red-coloured light; and that, conſequently, if we may infer

infer the quantity of the efficient from the effect produced, the inviſible rays of the ſun probably far exceed the viſible ones in number.

‘ To conclude,’ the author obſerves, ‘ if we call *light* thoſe rays which illuminate objects, and *radiant heat* thoſe which heat bodies, it may be inquired, whether light be eſſentially different from radiant heat? In anſwer to which I would ſuggeſt, that we are not allowed, by the rules of philoſophizing, to admit two different cauſes to explain certain effects, if they may be accounted for by one. A beam of radiant heat, emanating from the ſun, conſiſts of rays that are differently refrangible. The range of their extent, when diſperſed by a priſm, begins at violet coloured light, where they are moſt refracted, and have the leaſt efficacy. We have traced theſe calorific rays throughout the whole extent of the priſmatic ſpectrum; and found their power increaſing, while their refrangibility was leſſened, as far as to the confines of red-coloured light. But their diminiſhing refrangibility, and increaſing power, did not ſtop here; for we have purſued them a conſiderable way beyond the *priſmatic ſpectrum*, into an inviſible ſtate, ſtill exerting their increaſing energy, with a decreaſe of refrangibility up to the maximum of their power, and have alſo traced them to that ſtate where, though ſtill leſs refracted, their energy, on account, we may ſuppoſe, of their now failing denſity, decreaſed pretty faſt; after which, the inviſible *thermometrical ſpectum*, if I may ſo call it, ſoon vaniſhed.

‘ If this be a true account of ſolar heat, for the ſupport of which I appeal to my experiments, it remains only for us to admit, that ſuch of the rays of the ſun as have the refrangibility of thoſe which are contained in the priſmatic ſpectrum, by the conſtruction of the organs of ſight, are admitted, under the appearance of light and colours; and that the reſt, being ſtopped in the coats and humours of the eye, act

upon them, as they are known to do upon all the other parts of our body, by occasioning a sensation of heat.'

Art. 15. ' Experiments on the Solar, and on the Terrestrial Rays that occasion Heat; with a Comparative View of the Laws, to which Light and Heat, or rather the Rays which occasion them, are subject, in order to determine whether they are the same, or different:' by the same.—The chief design of the author in this paper is to give a comparative view of the operations that may be performed on the rays that occasion heat, and of those which we already know to have been effected on the rays that occasion light.

1. Light, both solar and terrestrial, is a sensation occasioned by rays emanating from luminous bodies, which have a power of illuminating objects; and, according to circumstances, of making them appear of various colours. In like manner, heat, both solar and terrestrial, is a sensation occasioned by rays emanating from candent substances, which have a power of heating bodies. This was proved by exposing a thermometer to the eye-end of a ten feet Newtonian Telescope. In this case, the rays which came from the sun, after undergoing three regular reflections, raised the thermometer 58 degrees. Thus, also, when the rays of a candle were reflected on the ball of a thermometer, by means of a small steel mirror, the instrument received $3\frac{1}{4}$ degrees of heat in the space of five minutes.

From other experiments it appeared, that the solar prismatic colours occasion heat by reflection. The heat of a red-hot poker, and that of a common coal fire, were likewise reflected by a plain mirror. Even a prism, which stops a great many heat-making rays, still reflected enough of them to occasion a considerable rise in the thermometer. The reflection of both invisible, solar, and culinary heat, were afterwards shewn.

ſhewn. The inviſible rays coming from a poker, cooled from being red-hot, till it could no longer be ſeen in a dark place, raiſed the thermometer ſeveral degrees in the ſpace of a few minutes.

2. The next point of compariſon between the rays occaſioning light and thoſe occaſioning heat, reſpects their being ſubject to the power of refraction. By a great number of ſimple and beautiful experiments, which our limits forbid us to particularize, it appeared, that not only ſolar heat, the heat of a candle, that accompanying the coloured part of a priſmatic ſpectrum, the heat of a chimney fire, and that of red-hot iron, were refrangible, and capable of being condenſed by means of proper lenſes; but that the inviſible ſolar rays, and inviſible culinary heat, were in like manner ſubject to the laws of refraction.

In a future paper it will be ſhewn, that the rays of heat, like thoſe of light, are of different refrangibility; that they are liable to be ſtopped, in certain proportions, when tranſmitted through diaphanous bodies; that they are liable to be ſcattered on rough ſurfaces; and may be ſuppoſed, when in a certain ſtate of energy, to have a power of illuminating objects.

Art. 16. 'Chemical Experiments on Zoophytes; with ſome Obſervations on the Component Parts of Membrane:' by *Charles Hatchett*, Eſq. F.R.S.—We entered at conſiderable length into the author's experiments and remarks on the nature and compoſition of ſhell and bone, as publiſhed in the Philoſophical Tranſactions of the preceding year.* Theſe proved, that there is a great ſimilarity in the conſtruction of ſhell and bone, each of them conſiſting in a depoſition of earthy matter on a gelatinous or membranous ſubſtance; the nature of the earth depoſited, however, differing in the two: the earth of bones conſiſting almoſt wholly of *phoſphate of lime*, while that of ſhells

* Vide page 12 of the preſent volume of our Review.

ſhells conſiſts of *carbonate of lime.* There appeared, likewiſe, to be an approximation or connecting link in the ſtructure of ſeveral cruſtaceous marine ſubſtances, ſuch as that which covers crabs, lobſters, cray-fiſh, and prawns. By a ſimilar method to that purſued in his former paper, the ingenious author now proceeds to inveſtigate the compoſition of *Zoophytes.* A conſiderable number of ſpecies were examined; as various *madrepores, millepores, tubipora muſica, fluſtra foliacea, corallina opuntia, iſis ochracea* and *hippuris,* different *gorgoniæ* or corals, *antipathes ulex* and *myriſphilla,* various *ſponges,* and *alcyonia.* All theſe were found chiefly to reſemble ſhells in the nature of their component parts, ſeveral of them, however, containing a larger or ſmaller portion of calcareous phoſphate.

With reſpect to the nature of the ſubſtance in and upon which the hardening or oſſifying principles were ſecreted and depoſited, it appeared to vary, from a very attenuated gluten, as in the porcellaneous ſhells, to a tough gelly, and from this to a perfectly organized membrane or cartilage, as in bone. The next object was to examine the nature of this cementing ſubſtance, which, as gluten or membrane, forms the baſis of all animal ſolids. This ſubſtance the author includes under the general term *gelatin,* which exiſts of various degrees of viſcidity, from ſimple mucilage to the ſtrongeſt and moſt viſcid glue. From the obſervations here made it appears, that gelatin is a component part of many animal ſubſtances: that it differs in quality from a very attenuated gelly or mucilage, to that viſcid ſubſtance called glue; the varieties of which alſo differ in ſolubility and tenacity: that it is preſent in various proportions; ſo that certain bodies, ſuch as the cutis, and the cartilages of the joints, are formed by it; while others, like nail, quill, and tortoiſe-ſhell, can ſcarcely be ſaid to contain it: and that by its preſence, in various ſtates and proportions, it may be regarded (including

cluding inherent moiſture and organic arrangement) as the principal cauſe of thoſe degrees of flexibility, of elaſticity, and of putreſcibility, ſo various in the different parts of animals.*

But when gelatin has been ſeparated from the different ſubſtances that contain it, either by repeated boiling with water, or by being ſteeped in dilute acids, a more inſoluble ſubſtance remains, of a very different nature, which the author next proceeds to inveſtigate. When a bone or piece of ivory has, by long boiling in water, been deprived of a great part of its gelatin, and is afterwards ſteeped in a dilute acid, the oſſifying ſubſtance is diſſolved, and the cartilage remains, retaining the figure of the original bone; or, if a ſimilar bone or piece of ivory, which has not been boiled, is ſteeped in a dilute acid (eſpecially nitric acid), the oſſifying ſubſtance is diſſolved,

* 'As gelatin, according to its proportion and quality, appears to produce conſiderable effects on the parts of animals in which it is preſent; and, as the gelatin in animal bodies is, in all probability, liable to be changed and modified by morbid cauſes, it is much to be wiſhed,' the author obſerves, 'that gentlemen of the medical profeſſion would aſcertain, by experiments, how far the tonic properties of the bark depend on the tanning principle.

'Mr. *Biggin* has proved (Philoſophical Tranſactions for 1799, p. 259), that willow bark, and eſpecially that of the Huntingdon or Leiceſter willow, contains the tanning matter in a conſiderable quantity; and that the latter, in this reſpect, even equals, or rather exceeds, that of oak.

'His friend, the Rev. *Thomas Rackett*, Rector of Spetiſbury and Charlton, in Dorſetſhire, has employed in thoſe pariſhes the bark of the common willow with great ſucceſs as a tonic and febrifuge. Moreover, Mr. *Weſtring*, of Norrkoping, has obſerved (*Annales de Chimie*, Tom 32. p. 179), that thoſe ſpecies of *cinchona* which contain the tanning principle in the greateſt quantity, are the moſt efficacious in fevers; and that the *cinchona floribunda*, which contains ſcarcely any tanning matter, is deſtitute of the above-mentioned beneficial effects. Mr. *Weſtring*, therefore, with great apparent reaſon, believes, that the relative effects produced by the different ſpecies of *cinchona*, when employed in medicine, are in proportion to their tanning power, or the quantity of tanning principle contained in them.

'If any one ſhould be induced to make experiments on the tonic effects of the tanning principle, it is to be hoped that ſome attention would alſo be paid to the medicinal properties of nitro-muriate of tin, of which, at preſent, I believe little or nothing is known.'

and,

and, at the fame time, but more flowly, the gelatin is feparated, and caufes the liquor to become yellow, when the phofphate of lime is precipitated by ammoniac.

The cartilaginous body which remains, after the gelatin has been thus feparated, is not eafily foluble in dilute acids; for (according to its texture) many weeks, and even months, may elapfe, before a fmall part is taken up; but in concentrated nitric acid, or in boiling dilute acid, it is rapidly diffolved.

This fubftance, when dry, is femi-tranfparent, like horn, and more or lefs brittle.

It is the predominant and effential part in the tiffue or the web of membrane, cartilage, fponge, the horny ftems of *gorgoniæ*, horn, hair, feather, quill, hoof, nail, horny fcale, cruft, and tortoife-fhell; and, although of fimilar chemical properties, yet in confiftency it varies, from a tender jelly-like fubftance, to a completely-formed membrane, or to an elaftic, brittle, and hard body, like tortoife-fhell.

The fubftances now mentioned refemble very nearly, in chemical properties, fimple and unorganized albumen; from which gelatin appears to be formed by the operations of the living fyftem; albumen being confidered as the original animal fubftance, from which the reft are formed. Tortoife-fhell, horn, mufcular fibre, and infpiffated albumen, are alike infoluble in boiling water; but after long immerfion in very dilute nitric acid, and after being well wafhed, they become foluble. By this immerfion in nitric acid a fubftance is formed, which, by becoming liquefied when heated, by being foluble in boiling water, by being precipitated by the tanning principle, and by nitro-muriate of tin, and, laftly, by forming a gelatinous mafs when the aqueous folution is fufficiently evaporated and coolled, feems to approach in its nature to gelatin.

'In attempting to prove,' the author obferves, 'that albumen, or the coagulating lymph, is the original

ginal animal ſubſtance, I have hitherto only ſtated chemical facts; but when the phenomena attending incubation are conſidered; when the experiments made by eminent phyſiologiſts, ſuch as *Haller*, *Maitre Jean*, and *Malpighi*, are viewed; when the oviparous fœtus is ſeen to be progreſſively formed in and from the albumen of the egg, ſo that, upon the burſting of the ſhell which ſeparated it from external matter, the young animal comes forth complete in all its parts; when ſuch ſtrong facts as theſe are corroborated by thoſe afforded by chemiſtry, it can ſcarcely be doubted that albumen is the primary animal ſubſtance, from which the others are derived; and there is much cauſe to believe that the formation of gelatin, and of the animal fibre eſpecially, begins with the proceſs of ſanguification in the fœtus.

'As the three principal and eſſential component parts of the blood, viz. albumen, gelatin, and fibre, appear therefore to compoſe the various parts of animals, in ſuch a manner that one (being predominant) influences the nature of that part of the animal which it is principally employed to form; and as albumen, gelatin, and fibre, by relative proportion, by the degrees of denſity, by the effects of organization, which ſingly or conjointly they have experienced, by the texture of the animal ſubſtance which they, as materials, and thus modified, have concurred to produce, and by the proportion of natural or inherent moiſture peculiar to each part of different animals, preſent an immenſe ſeries of complicated cauſes, ſo are the effects found to be no leſs numerous and diverſified, by the infinite variety in texture, flexibility, elaſticity, and the many other properties peculiar to the various parts which compoſe the bodies of animals.'

Gelatin, albumen, and muſcular fibre, appear to differ very much in the quantity of carbon they contain: 500 grains of iſinglaſs, made perfectly dry, were found

found to contain about 54 grains of this principle; an equal quantity of dry albumen, 63 grains; of tortoise-shell, 77 grains; whilst the dry prepared muscular fibre of beef contained 82 grains. As in vegetables, the fibrous part is that which contains the largest proportion of carbon, so, in respect to the other animal substances, muscular fibre appears to contain the greatest quantity of it.

Art. 17. 'On the Electricity excited by the mere contact of conducting substances of different kinds. In a letter from M. *Alexander Volta*, Professor of Natural Philosophy in the University of *Pavia*, to *Sir Joseph Banks*, Bart.'—This paper contains a highly interesting account of the effects produced by the Galvanic pile, the leading circumstances respecting which we have already noticed.* This apparatus, M. *Volta* thinks, bears a much nearer resemblance to the natural electric organ of the torpedo, the electric eel, &c., than to the leyden phial, and common electric battery. Like the former, it is composed of conducting substances alone; it is active by itself, without any previous charge, and without the aid of electricity excited by any means hitherto known; acting without cessation, and capable every instant of giving shocks, more or less strong, according to circumstances, and which at length terminate in stupor of the affected limb. The author employed alternate plates of copper or brass, and tin, with effect; but silver and zinc succeeded better. It is necessary that the fingers with which the pile is touched, be well moistened with water. But in order to succeed with greater certainty, and receive more powerful shocks, the foot of the column should be made to communicate, by means of a metallic plate or thick wire, with a vessel of water, into which one or more of the fingers should be plunged, whilst the head of

* *Vide* pp. 96 and 293.

the

the pile is touched with a clean piece of metal, firmly grafped in the other hand, fufficiently moiftened.

If the hands be kept in continued contact with the extremities of the pile, in the manner mentioned, inftead of repeated fhocks, a lafting pain is felt, which remains as long as the communication is thus kept up; fhewing that the electric or Galvanic fluid is in a ftate of conftant circulation. The fenfation excited, too, is greater when the part is in contact with the negative fide, that is the zinc, than when with the pofitive or filver fide of the apparatus; in other words, more pain is felt when the fluid is paffing from the part, than in the contrary direction.

The laft article in the prefent part of the *Tranfactions* refers to a fubject of fome curiofity in *Natural Hiftory*, but requires no particular notice here: it is entitled, 'Some Obfervations on the Head of the *Ornithorhyncus Paradoxus*,' by Mr. *Home*.

Art. LII. *Phytologia; or the Philofophy of Agriculture and Gardening, &c. By* Erasmus Darwin, *M.D. &c.*

(Continued from page 251.)

IN our laft we followed the ingenious author in his explanation of many important parts in the ftructure of vegetable beings; fuch as their abforbent and umbilical veffels; their pulmonary and aortal fyftems. We are now to fpeak of parts of equal moment, their glands, and organs of reproduction; their mufcles, nerves, and brain. It is not to be expected that Dr. *Darwin* will, in all cafes, carry the imaginations of his readers along with him, in the courfe of fo obfcure a fubject; but though he fometimes fails in producing

ing conviction, we are always interested in the originality of his ideas.

The structure of the glands of animals, the author observes, has not yet been fully ascertained. Little more is known of them than their effect, which is, that they secrete, that is, separate or produce, some fluid from the blood, as bile, saliva, urine, milk, &c. The vessels of vegetables being still more minute, and more rigid, the structure of their glands is still further removed from our discovery. Their effects are, however, as evident as those of the glands of animals in the secretion or production of various fluids, which become solid as their aqueous parts are absorbed or exhaled; as mucilage, starch, oil, sugar, honey, wax, turpentines, essential oils, aromatics, bitters, narcotics, acrids, acids, and a variety of other materials, which fill our barns and granaries, and crowd the shops of the druggist. Each of these is considered in order.

'*Mucilage* is found in all parts of plants, as being an essential constituent of vegetable as of animal bodies, and serving, probably, as nourishment to the plant. *Starch* is another kind of mucilage, which differs from that above-mentioned, or gum, in its property of not dissolving in cold water, and can hence be easily separated from it. There is reason to believe, that the mucilage during the growth of the plant is converted into starch; and that this process continues in grain some time after it is carried into the barn or granary, which occasions old wheat to produce better flour for the baker; and old oats and old beans are universally believed to give more nourishment to horses. I shall here add a conjecture, that I suppose the use of alum in making bread consists in its coagulating the mucilage, and perhaps thus contributing to convert it into starch; for the bakers mix it principally with new wheat; and affirm, that it makes the flour of new wheat equal to old.

'Where much alum is mixed with bread, it may be distinguished by the eye by a curious circumstance

ſtance, which is, that, when two loaves have ſtuck together in the oven, they break from each other with a much ſmoother ſurface, where they had adhered, than thoſe loaves do which do not contain alum.'

The digeſtive power of animals ſeems to be principally exerted in converting their food into ſugar; ſince the chyle of all animals reſembles milk, which contains much ſugar, and thence ſpontaneouſly runs into fermentation, which terminates in the production of acid. In like manner, the digeſtive powers of the young vegetable, with the chemical agents of heat and moiſture, convert the ſtarch or mucilage of the root or ſeed into ſugar for its own nouriſhments; or they obtain ſugar ready prepared for them from ſome roots, as the beet-root; from many fruits, as grapes, pears, peaches; from the milk of cocoa-nuts, and from the ſap-juice of the ſugar-maple, birch, and many other trees. And thus it appears probable, that ſugar is the principal nutriment of both animal and vegetable beings. That it is the moſt nutritive part of vegetable ſubſtances is evinced by the well-aſcertained fact, that the ſlaves in Jamaica grow fat in the ſugar-harveſt, though they endure at that time much more labour.

The uſe of this ſaccharine matter of the fruit or ſap-juice in the vegetable oeconomy, is for the purpoſe of ſupplying the young ſeed or bud with nouriſhment, to enable it the better to ſtrike its roots into the earth, and to elevate its leaves into the air; and thus by its quicker growth to rival its neighbours in their contentions for air, and light, and moiſture, which are neceſſary for its exiſtence.

The production of honey is another effect of the vegetable ſecretions, and ſeems to be intended to ſupply nouriſhment to the anthers and ſtigmas, as the nectary, or honey-gland, always falls off along with the corol, and anthers, and ſtigmas. The univerſality of this production in the vegetable world, and the very complicated apparatus which Nature has

conſtructed in many flowers, as well as the acrid or deleterious juices ſhe has furniſhed thoſe flowers with, as in the aconite, to protect this honey from rain, and from the depredations of inſects, ſeem to imply, that this fluid is of very great importance in the vegetable oeconomy; and alſo that it was neceſſary to expoſe it to the open air previous to its re-abſorption into the vegetable veſſels. From this proviſion of honey for the male and female parts of flowers, and from the proviſion of ſugar, ſtarch, and mucilages, in the fruits, ſeeds, roots, and alburnum of plants, laid up for the nutriment of the young progeny, not only a very numerous claſs of inſects, but a great part of the larger animals, procure their food.

In the next ſection (the 7th) the organs of reproduction of vegetables are treated of. The theory of *Linneus*, which ſuppoſes that the medulla extends itſelf till it burſts the incloſing or cortical part, and joining with that produces a new bud, is objected to, as too mechanical for a living organized ſyſtem. Every new fluid or ſolid produced in the organic ſyſtem of vegetable, as well as of animal, bodies, is ſecreted, the author imagines, from their blood; as the various fluids of bile, ſaliva, tears, in animals; and thoſe of gum, reſin, ſugar, in vegetables. In like manner, the *flavilla vitæ*, the new ſpark of being, or living entity, is ſecreted from the blood of male animals by adapted glands, to be received into a proper nidus, and nouriſhed by the female.

The progeny of vegetables, we have already ſeen, is of two kinds, lateral and ſexual. As the leaf with its petiole, or foot-ſtalk, and its caudex down the bark of a tree, with its radicle beneath, conſtitutes an individual plant, it may be concluded from the ſtrongeſt analogy, the author thinks, that this new progeny is ſecreted from a gland or glands of the parent; and that, as it adheres to the parent, it requires

quires no female apparatus for its reception, nouriſhment, or oxygenation. This, therefore, may be conſidered as a paternal progeny. This paternal offſpring of vegetables in their buds and bulbs is attended with a very curious circumſtance; and that is, that they exactly reſemble their parents, as is obſervable in grafting fruit-trees, and in propagating flower-roots; whereas the ſeminal offspring of plants, being generated by two parents, and certainly ſupplied with nutriment by the mother, is liable to perpetual variation.

This ſimilarity of buds and bulbs to their parents is to be underſtood only to exiſt after the maturity of the plant, that is, after it has produced a ſexual offſpring in flowers and ſeeds; for a bulb, as of a tulip, and a bud of a fruit-tree, when firſt raiſed from their ſeed, are very ſmall, but produce one or more improved bulbs, or improved buds, annually for ſome years; which differ from their parent bulbs or buds in their ſize, form, and colour of their leaves, till it arrives at its maturity, or acquires the power of generating a ſexual progeny; from whence it appears, that the leaf-buds of thoſe trees, and the leaf-bulbs of thoſe roots, which have acquired their puberty, if it may be ſo called, that is, their power of generating flowers, are a more perfect progeny than the ſeeds of thoſe plants, as theſe latter, when ſeparated from their parent either by tranſplantation or by ingrafting, can immediately produce ſeeds, or a ſexual progeny; but the buds from many ſeeds are ſome years before they can produce ſeeds. The ſame is probably true of many annual or biennial plants, as of wheat, which produce many ſucceſſive buds upon each other previous to the flower-bud, as appears by the joints of the ſtem; all which may be conſidered as individual plants growing on each other like the annual ſucceſſion of the buds of trees.

Section 8 treats of the muſcles, nerves, and brain, of vegetables. 'The various motions of peculiar parts of vegetables evince the exiſtence of muſcles and nerves in thoſe parts, ſuch as the cloſing of their petals, and calyxes, at the approach of night, or in cold or wet weather; though the fibres and nerves, which conſtitute theſe muſcles, are too fine for anatomical demonſtration.

'Some vegetables fold the older leaves over the new buds at the extremity of their ſtalks during the night, as *alſine*, chick-weed; others, as the *mimoſa*, ſenſitive plant, fold the upper or poliſhed ſides of their leaves together during their ſleep. The *hedyſarum gyrans* whirls its leaves in various directions, when the air is ſtill, by an apparently voluntary effort for the purpoſe of reſpiration. The *dionæa muſcipula*, Venus's fly-trap, cloſes its leaves from the ſtimulus of inſects, which crawl upon them, and pierces them with its prickles. And the *apocynum androſemifolium* contracts its petals or nectaries round the proboſcis of the flies, which ſtimulate it, and holds them till they die, or till the ſleep of the plant releaſes them by the relaxation of its muſcular action.

'From theſe circumſtances it appears, that there are not only muſcles about the moving foot-ſtalks or claws of the leaves and petals above-mentioned, but that theſe muſcles muſt be endued with nerves of ſenſe as well as of motion. Now, as when one part of a leaf of mimoſa is touched, the whole leaf falls, it follows, there muſt be a common ſenſorium, or brain, where the nerves communicate, belonging to this one leaf-bud. To evince this further, another leaf-let was ſlit with ſharp ſciſſars, and ſome ſeconds of time elapſed, before the plant ſeemed ſenſible of the injury; and then the whole plant collapſed as far as the principal ſtem. Afterwards a ſmall drop of oil of vitriol was put on the bud in the boſom of a leaf of another ſenſitive plant; and after about half

half a minute, when the brain of this bud could be ſuppoſed to be deſtroyed, the whole leaf fell, and roſe no more. If the individual buds of plants poſſeſs muſcles and nerves with a brain, or common ſenſorium, the following queſtions conſequently occur, and ſhould be anſwered in the affirmative. Have vegetable buds irritability? Have they ſenſation? Have they volition? Have they aſſociations of motions? I am perſuaded they poſſeſs them all, though in a much inferior degree even than the cold-blooded animals.'

The irritability of plants is further evinced by the abſorption and circulation of their fluids, and by the effects of the electric ſhock. Their ſenſibility is ſhewn by the collapſe of mimoſa, and by the opening and cloſing of many leaves and flowers. That theſe actions are not produced ſimply by irritation on the muſcles themſelves, but by the connexion of thoſe muſcles with a ſenſitive ſenſorium, or brain, exiſting in each individual bud or flower, appears, 1ſt. becauſe many flowers cloſe from defect of ſtimulus, not by the exceſs of it, as by darkneſs, which is the abſence of the ſtimulus of light; or by cold, which is the abſence of the ſtimulus of heat. Now the defect of heat, like the abſence of food, or of drink, affects our ſenſes with pain, which had been previouſly accuſtomed to a greater quantity of them, and a cutaneous ſhivering may be excited in conſequence of the pain; but a muſcle cannot be ſaid to be ſtimulated into action by a defect of ſtimulus, though ſome modern writers on medicine have called cold a ſtimulus to animal fibres, which it always renders torpid or inactive; a theory derived from Galen, and which muſt have originated in his total ignorance of chemiſtry and natural philoſophy.

In ſome flowers the males bend into contact with the females, as in *ciſtus*, *kalmia*, *fritillaria perſica*, *lithrum ſalicaria*; in others, the female bends to the males, as in *collinſonia*, *glorioſa*, *geniſta*, *epilobium*; which ſhews a ſenſibility to the paſſion of reproduc-

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tion. In *irritation* the ſtimulated muſcles only are brought into action, without being perceived by the other parts of the ſyſtem; but in *ſenſation* the whole ſyſtem is affected by means of the brain or common ſenſorium, and thence by diſtant muſcles are brought into action to acquire an agreeable object, or to repel or withdraw from a diſagreeable one.

That plants poſſeſs in ſome degree the power of volition, appears, amongſt other circumſtances, from their ſleep, and from the tendrils of vines, and the ſtems of other climbing vegetables, which continue to move round, till they find ſomething to adhere to, or till they have rolled themſelves up in a ſpiral line like a cork-ſcrew.

In reſpect to vegetables acquiring aſſociations of motion, or habits of action, the former is ſeen in the motions which have been already mentioned, and which could not be performed without the ſynchronous and aſſociated actions of many muſcles. Other acquired habits of vegetable actions appear from the grains and roots brought from more ſouthern latitudes, which germinate here ſooner than thoſe which are brought from more northern ones, owing to their acquired habits (*Fordyce* on Agriculture). And from the apple-trees ſent from hence to New York, which bloſſomed for a few years too early for the climate, and bore no fruit; but afterwards learnt to accommodate themſelves to their new ſituation.

Vegetables ſeem to poſſeſs a ſenſe of heat, of light, of moiſture, and the ſenſe of touch. The approach of the anthers to the ſtigma in many flowers, and *vice verſa*, is probably directed, the author obſerves, by a ſenſe analogous to the ſenſe of ſmell. 'Thus, beſides a kind of taſte or appetency at the extremities of their roots, ſimilar to that of the extremities of our lacteal veſſels, for the purpoſe of ſelecting their proper food; and beſides different kinds of irritability or appetency reſiding in the various glands which ſeparate honey, wax, reſin, and other juices from their

their blood; vegetable life ſeems to poſſeſs an organ of ſenſe to diſtinguiſh the variations of heat, another to diſtinguiſh the varying degrees of moiſture, another of light, another of touch, and probably another analogous to our ſenſe of ſmell. To theſe muſt be added, the indubitable evidence of their paſſion of love, and of their neceſſity to ſleep; and I think we may truly conclude, that they are furniſhed with a brain or common ſenſorium belonging to each bud.' —This common ſenſorium, the author ſuſpects, may reſide in the medulla or pith which occupies the central parts of every bud and leaf, like the ſpinal marrow of animals.

This brings us to the concluſion of the firſt part of the work, or that which treats of the *phyſiology* of vegetation. The ſecond part, which we are now to notice, relates to the *oeconomy* of vegetables, and embraces the growth of ſeeds, buds, and bulbs; manures, or the food of plants; draining and watering lands; aeration and pulverization of the ſoil; the effects of light, heat, and electricity; and, laſtly, the diſeaſes of plants.

Seeds, the author obſerves, reſemble eggs. After the production of the ſeed, or vegetable egg, in the pericarp of flowers, and its enſuing impregnation by the farina of the anthers ſhed upon the ſtigma, a coagulated point appears upon the ſeed-lobes, according to the obſervations of *Spallanzani*, like the cicatricula on the yolk of the egg, and which derives its nouriſhment from the ſeed-lobes or cotyledons. This it does by means of veſſels which permeate them for that purpoſe, and have been termed umbilical veſſels: it afterwards ſhoots its roots down into the fruit, or into the earth, in ſearch of other nouriſhment; and expands its leaves in the air as an organ of reſpiration.

Other vegetable embryons are produced in the buds on the ſtem or branches of trees, which may be

termed the viviparous progeny of plants, in contradiſtinction to thoſe from ſeeds, which may be termed their oviparous progeny. Theſe buds are either leaf-buds or flower-buds, or both in one covering; the bud is termed hybernaculum, or winter-cradle of the embryon ſhoot, and is covered with ſcales, and often a reſinous varniſh, as in tacamahacca, to protect it from the cold and moiſture of the enſuing winter, and from the depredation of inſects.

Theſe, by inoculation, or ingrafting on other ſtems of trees, or by being planted in the earth, become plants exactly ſimilar to their parents. A ſmall glaſs inverted over theſe buds, when ſet in the earth, contributes to inſure their growth by preventing too great an exhalation; otherwiſe they are liable to perſpire more than they can abſorb, before they have acquired roots: this the gardeners call piping a ſlip, or a cutting of a plant. In this ſituation a greater heat may be given them, as in hot-houſes, without increaſing their quantity of perſpiration, which ceaſes as ſoon as the air in the glaſs is ſaturated with moiſture; and the increaſe of heat much contributes to the protruſion of their roots and new buds, as they can at the ſame time bear to be ſupplied with a greater quantity of moiſture.

Amongſt vegetable facts, there is none more curious than the converſion of leaf-buds into flower-buds, which is believed to take place by a certain management in their early ſtate. Thus if the upper part of a branch be cut away, the buds near the extremity of the remaining ſtem, having a greater proportional ſupply of nutriment, and poſſeſſing a greater facility of producing their new caudexes along the bark, will become leaf-buds, which might otherwiſe have been flowering-buds; and, on the contrary, if a vigorous branch of a wall-tree, which was expected to bear only leaf-buds, be bent down to the horizon, or lower, it will bear flower-buds with weaker leaf-buds. On this circumſtance chiefly depends the management of wall-

wall-fruit trees, and of eſpaliers. For the purpoſe of thus converting leaf-buds into flower-buds, it has been adviſed alſo to bind ſome of the moſt vigorous ſhoots with ſtrong wire, and even ſome of the large roots. Others ſcore the bark in a ſpiral direction, or cut off an entire cylinder of the bark, three or four inches long, and replace it with a proper bandage.

The bulbous-roots of ſome perennial herbaceous plants, and the root-ſcions of others, are ſimilar in this reſpect, and which diſtinguiſhes them from buds; that they are generated on the broad caudex of the plant within the ground, or in contact with it, and immediately ſhoot down their new roots into the earth. Whereas buds are formed above the ſoil on the long caudexes, which conſtitute the filaments of the bark of trees, and ſhoot down new roots into the earth from the lower end of theſe elongated caudexes. Bulbs have not improperly been called ſubterraneous buds; and, like them, they may be divided into leaf-bulbs and flower-bulbs. Thus when a tulip-ſeed is ſown, it produces a ſmall plant the firſt ſummer, which in the autumn dies, and leaves in its place one or more bulbs. Theſe are leaf-bulbs, which in the enſuing ſpring riſe into ſtronger plants than thoſe of the firſt year, but no flowers are yet generated; in the autumn theſe periſh like the former, and leave in their places other leaf-bulbs, ſtronger, or more perfect, than their preceding parents. This ſucceſſion of leaf-bulbs continues for four or five years, till at length the bulb acquires a greater perfection of maturity neceſſary for ſeminal generation, and produces in its place a large flower-bulb in the centre, with ſeveral leaf-bulbs around it.

This circumſtance, the author obſerves, of the ſucceſſive production of leaf-buds or flower-bulbs previous to the production of flower-buds or flower-bulbs, is wonderfully analogous to the generation of the *aphis*, which, riſing from an egg in the ſpring, after caſting its ſkin once or twice, produces a living progeny

geny without amatorial copulation; and this offspring produces others by this ſolitary propagation till the tenth generation; then a ſexual progeny of males and females is produced, and eggs are laid in the autumn from their amatorial intercourſe (Encycloped. Britan. Amænitat. Academ. Vol. VII. By A. T. Bladh:). Thus this inſect from the egg requires to be reproduced many times by ſolitary propagation, before it becomes ſufficiently perfect to generate a ſexual offspring like the buds and bulbs from ſeeds above-mentioned.

The next ſection treats of manures, or the food of plants. Similar to the chyle of animals, the ſap-juice which is abſorbed from the earth by the roots of plants, conſtitutes their nouriſhment, and conſiſts of water, ſugar, mucilage, with other tranſparent ſolutions, as of carbon, phoſphorus, and calcareous earth; and though it has been proved by the experiments of ſome philoſophers, that vegetables, can contract or compoſe all theſe ſubſtances from air and water alone, yet ſome materials contribute more to the production of this vegetable chyle or ſap-juice than others, ſuch as the recrements of dead vegetable and animal ſubſtances.

The embryon plant in the ſeed or fruit is ſurrounded with ſaccharine, mucilaginous, and oily materials, like the animal fetus in the egg or uterus, which it abſorbs, and converts into nutriment, while the embryon buds of deciduous trees, which is another infantine ſtate of vegetables, are ſupplied with a ſaccharine and mucilaginous juice prepared for them at the time of their production, and depoſited in the roots or ſap-wood of their parent-trees, as in the vine, maple, and birch; which ſaccharine matter is ſoluble and miſcible with the water of the ſurrounding earth in the ſubſequent ſpring, and is forcibly abſorbed by their root-veſſels, and expands their naſcent foliage. In their infantine ſtate, therefore, there

there is a wonderful analogy between plants and animals.

With respect to the food of adult plants, a great and essential difference exists between the nutritive processes of animals and vegetables. The former are possessed of a stomach, by which they can in a few hours decompose the tender parts of vegetable and animal substances by a chemical process within themselves, conducted in the heat of ninety eight degrees, with a due quantity of water, and a perpetual agitation of the ingredients; which both mixes them, and applies them to the mouths of the absorbent vessels which surround them. Whereas a vegetable being having no stomach, is necessitated to wait for the spontaneous decomposition of animal or vegetable recrements; which is indeed continually going on in those soils, and climates, and in those seasons of the year, which are most friendly to vegetation; but is in other situations, and in other seasons, a slow progress in a degree of heat often as low as forty in Fahrenheit (in which the rein-deer moss, *moschus rangiferinus*, vegetates beneath the snow in Siberia), and often without an adapted quantity of water to give a due fluidity, or any mechanical locomotion to present them to the absorbent mouths of their roots; or, in still worse situations, adult vegetables are necessitated still more slowly to acquire or produce their nutritive juices from the simpler elements of air and water, with perhaps the solutions of carbonic acid and calcareous earth, and perhaps of some other matters, with which one or more of them abound.

The author then treats of the individual elements and substances capable of affording nourishment to plants, as air, water, carbon, phosphorus, lime, and clay. The section is concluded with observations on manures in general, and their application. A fund of valuable and interesting remarks is here contained, of great importance to the arts of agriculture and farming.

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We paſs over the two following ſections (11 and 12), as too technical for our purpoſe. The 13th ſection is devoted to the conſideration of light, heat, and electricity, with an examination of their effects on vegetation. The conteſt for light, as well as for air, which is ſo viſible in the growth of vegetables, ſhews the former to be of great conſequence to their exiſtence as well as the latter. Thus many flowers follow the ſun during the courſe of the day by the nutation of the ſtalks, not by the rotation of them, as obſerved in the ſun-flower by Dr. *Hales*; and the leaves of all plants endeavour to turn their upper ſurfaces to the light, which is their reſpiratory organ, or lungs.

The great uſe of all plants turning the upper ſurfaces of their leaves to the light, in the author's opinion, is thus intelligible. The water perſpired from thoſe ſurfaces is hyper-oxygenated; and, as it eſcapes from the ſharp edges of the mouths of the perſpiring veſſels, when acted upon by the ſun's light, gives out oxygen; which oxygen, thus liberated from the perſpired water, and added to that of the common atmoſphere, preſents to the reſpiratory terminations of the pulmonary arteries on the upper ſurfaces of their leaves an atmoſphere more replete with vital air.

This neceſſity of light to the reſpiration of vegetables is ſo great, that there is reaſon to believe, that many plants do not reſpire during the night, but exiſt in a torpid ſtate like winter-ſleeping inſects. Thus the *mimoſa*, ſenſible plant, and many others, cloſe the upper ſurfaces of their oppoſite leaves together during the night, and thus preclude them both from the air and light. And the internal ſurfaces of innumerable flowers, which are the reſpiratory organs, are cloſed during the night, and thus unexpoſed to light and air.

The fungi, nevertheleſs, which are termed vegetables, becauſe they are fixed to the earth, or to the ſtones, or trees, or timber, where they are found, can exiſt

exiſt without light or much air; as appears in the truffle, which never appears above ground; and by other fungi, which grow in dark cellars; and in eſculent muſhrooms, which are cultivated beneath beds of ſtraw. From this circumſtance of their exiſting without light, and from their ſmell of volatile alkali, like burnt feathers, when they are burnt, and from their taſte when cooked and eaten, they ſeem to approximate to the animal kingdom.

The vital air produced during the immerſion of vegetables in water, Dr. Darwin thinks, may be owing to the action of the ſun's light on the water, inſtead of being given out by exhalation from the vegetables themſelves.

The effects of *heat* on vegetation are too well known to require particular notice. Without fluidity, the blood or juices cannot circulate in animal or in vegetable veſſels; whence ſo great a diminution of heat as to produce froſt, on this account, would deſtroy them, if long continued; at the ſame time, too great a deduction of heat is known to deſtroy the irritability of animal as well as of vegetable fibres, and muſt on this account alſo prevent the circulation of their fluids, and occaſion the mortification of parts of them, or the death of the whole. But when fluids are converted into ice, the bulk of them is enlarged to a conſiderable degree, and that with ſuch violence, as to burſt iron veſſels, as bombs, which are filled with water. Whence, in this manner alſo, froſt deſtroys thoſe parts of vegetables which are moſt ſucculent; as the early ſhoots of aſh-trees, and other young plants, are frequently deſtroyed in the beginning of May by a froſty night. Mr. *John Hunter*, by applying thermometers to the internal parts of vegetables newly opened, diſcovered, that they poſſeſſed in froſty ſeaſons a degree of heat above that of the atmoſphere, though leſs than that of cold-blooded animals.

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The effects of *electricity* on vegetation have been much disputed by writers. Both M. *Ingenhouz* and M. *Rouland* doubt whether any such effect is exerted; and this after having held the contrary opinion. Other naturalists, however, think they have ascertained by their experiments that electricity accelerates vegetation; an opinion to which the author inclines.

The experiments which have been hitherto made on this subject have been with the positive sort, or that which has been called the vitreous, by those who have held the theory of two electric fluids, the vitreous or positive, and the resinous or negative, and which they think better explains the various phenomena, than the mechanical theory of Dr. *Franklin*. It is therefore to be wished, the author observes, that some future experiments may be made with the resinous or negative electricity in preference to the other, or with both of them alternately or comparatively. A friend of the author's, in June 1797, sowed mustard-seed in four garden pots. He subjected one of these to positive or vitreous electricity, and another to negative or resinous electricity, and observed that the seeds in the pot subjected to the negative, germinated a day before the pot subjected to the positive, and both of them much before the two pots which were not electrified, but otherwise under the same circumstances.

Section 14. *Diseases of Plants.* These are classed under four general heads. 1. Diseases from internal causes. 2. Diseases from external elements. 3. Diseases from insects; and, 4. Destruction by vermin. Under each of these a variety of important matters will be found, for the chief of which we must refer to the work itself.

The circumstances attending vegetable irritability are similar to those belonging to the irritability of animals upon a less extensive scale. When vegetable fibres have been long stimulated, more than natural

tural or ufual, by increafe of heat, the fpirit of vegetation becomes exhaufted, and in confequence a flighter degree of cold will deftroy them; becaufe their fibres, after having been long excited by a greater ftimulus, will ceafe to act on the application of one which is much lefs; whence, after hot days, tender plants are more liable to be deftroyed by the coldnefs of the night. Whence, in more northern climates, the gardeners fhade their tender vegetables, as the flowers of apricots, in the fpring-frofts, from the meridian fun, as well as from the coldnefs of the night; which is generally the greateft about an hour before fun-rife.

On the contrary, when plants have been long expofed to a lefs ftimulus of heat than natural or ufual, the fpirit of vegetation becomes accumulated; and if they are too fuddenly fubjected to much greater heat, their too great increafe of action induces inflammation, and confequent mortification, and death; as occurs to thofe people who have had too much heat applied to their frozen limbs. Experiments of this kind were inftituted by *Von Uflar:* he increafed the irritability of *euphorbia* and *efula* by fecluding light and heat from them; and when he expofed them to the meridian fun, they became gangrenous, and died in a fhort time. A number of facts in vegetation are adduced in fupport of thefe principles.

The difeafes to which particular names have been given, and which are here treated of, are the following. 1. *Eryfiphe,* or mildew, a plant of the fungus kind, which will grow without light or change of air, like other fungufes; and with its roots penetrates the veffels of the vegetables to which it adheres. 2. *Rubigo,* ruft, probably another fungus, which grows beneath the leaves of vegetables previoufly difeafed. Thefe are both removable, probably, by expofure to more light, and greater ventilation.

3. *Clavis, ergot,* or *fpur,* occurs when feeds grow out into large horns, black without, as in fecale, rye, and

and in carex; and is thought to be owing to the punᶜture of inſeᶜts. 4. *Uſtilago*, ſmut, when the fruit, inſtead of ſeed, produces a black meal, as in wheat, &c. Beſides theſe diſeaſes, there are probably many others, which have not yet been ſufficiently attended to; as the canker, *gangræna*; the honey-ſweat, *exudatio mellita;* the miliary ſweat, *exſudatio miliaria*; the ſap-flow, *fluxus umbilicalis;* and the gum-ſecretion, *excretio gummoſa.*

The external cauſes of diſeaſe enumerated are, exceſſes of heat and cold, moiſture and drought, light and darkneſs, lightning, impurities of ſoil, noxious exhalations, and external injuries. It is curious to obſerve, that vegetables, as well as animals, are ſubject to the influence of poiſonous ſubſtances, and hence a further analogy appears between vegetable and animal life. A ſlight ſolution of arſenic ſprinkled on a peach-tree in the ſpring, deſtroyed the branches which received it. A ſolution of liver of ſulphur was equally fatal to the branches of a nectarine-tree; and alſo oil of turpentine.

The remainder of the volume is devoted to practical agriculture and gardening, to the profeſſors of which arts it will no doubt prove highly uſeful and inſtructive.

Art. LIII. *Reſearches, Chemical and Philoſophical, chiefly concerning Nitrous Oxide, &c.* By Humphry Davy.

(Continued from page 279.)

IN our laſt, we accompanied the ingenious author in his obſervations and experiments on the nature and production of *nitrous oxide*, and other ſimilar

lar combinations. We are now to fee its effects on the animal oeconomy.

The term *refpirable*, Mr. Davy obferves, in its phyfiological application, has been differently employed. Some times by the refpirability of a gas has been meant its power of fupporting life for a great length of time, when repeatedly applied to the blood in the lungs. At other times all gafes have been confidered as refpirable, which were capable of introduction into the lungs by voluntary efforts, without any relation to their vitality. In the laft fenfe the word refpirable is moft properly employed. In this fenfe it is ufed in the following fections.

Non-refpirable gafes are thofe, which when applied to the external organs of refpiration, ftimulate the mufcles of the epiglottis in fuch a way as to keep it perfectly clofe on the glottis; thus preventing the fmalleft particle of gas from entering into the bronchia, in fpite of voluntary exertions; fuch are carbonic acid, and acid gafes in general.*

Of refpirable gafes, or thofe which are capable of being taken into the lungs by voluntary efforts, one only has the power of uniformly fupporting life;—atmofpheric air. Other gafes, when refpired, fooner or later produce death; but in different modes. Some, as nitrogene and hydrogene, effect no pofitive change in the venous blood. Animals immerfed in thefe gafes die of a difeafe produced by privation of atmofpheric air, analogous to that occafioned by their fubmerfion in water, or non-refpirable gafes. Others, as the different varieties of hydro-carbonate, deftroy life by producing fome pofitive change* in the blood, which probably immediately renders it incapable of fupplying the nervous and mufcular fibres with principles effential to fenfibility and irritability. Oxygene,

* See the curious experiments of Rofier, Journal de Phyfique, 1786, vol. 1, page 419.

† As appears from the experiments of Dr. Beddoes; likewife thofe of Mr. Watt.

 which

which is capable of being reſpired for a much greater length of time than any other gas, except common air, finally deſtroys life; firſt producing changes in the blood, connected with new living action.†

The effects of nitrous oxide by reſpiration were firſt obſerved in warm-blooded animals. A ſtout and healthy young cat was introduced into a large jar of the gas. For ten or twelve moments he remained perfectly quiet, and then began to make violent motions, throwing himſelf round the jar in every direction. In two minutes he appeared quite exhauſted, and ſunk quietly to the bottom of the jar. On applying the hand to the thorax, the heart was found to beat with extreme violence, and a quick and ſtrong pulſation of the carotids was perceptible. In about three minutes the animal revived, and panted very much; but ſtill continued to lie on his ſide. His inſpirations then became longer and deeper, and he ſometimes uttered very feeble cries. In four minutes the pulſation of the heart appeared quicker and feebler. His inſpirations were at long intervals, and very irregular; in five minutes the pulſe was hardly perceptible; he made no motions, and appeared wholly ſenſeleſs. After five minutes and a quarter he was taken out, and expoſed to the atmoſphere before a warm fire. In a few ſeconds he began to move, and to take deep inſpirations. In five minutes he attempted to riſe on his legs; but ſoon fell again, the extremities being ſlightly convulſed. In eight or nine minutes he was able to walk, but his motions were ſtaggering and unequal, the right leg being convulſed, whilſt the other was apparently ſtiff and immoveable; in about half an hour he was almoſt completely recovered.

A great many other experiments of the ſame kind were made with different animals, and with a nearly

* As appears from the experiments of Lavoiſier and Dr. Beddoes; and as will be ſeen hereafter.

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fimilar refult. In each of them a certain abforption of the gas was always perceived.

On examining the effects of nitrous oxide as compared with hydrogene and immerfion in water, it was found, that animals lived at leaft twice as long in nitrous oxide as in hydrogene or water. Confequently, from this circumftance alone, there was every reafon to fuppofe that their death in nitrous oxide could not depend on the fimple privation of atmofpheric air; but that it was owing to fome peculiar changes effected in the blood by the gas.

The external appearance of animals that have been deftroyed in nitrous oxide, is very little different from that of thofe killed by privation of atmofpheric air. Their internal organs, however, exhibit a very peculiar change. The lungs are pale brown red, and covered here and there with purple fpots; the liver is of a very bright red, and the mufcular fibre in general dark. Both the auricles and ventricles of the heart are filled with blood. The auricles contract for minutes after the death of the animal. The blood in the left ventricle, and the aorta, is of a tinge between purple and red, whilft that in the right ventricle is of a dark colour, rather more purple than the venous blood. It deferves to be noticed, that whenever the gall-bladder and urinary bladder have been examined in animals deftroyed in nitrous oxide, they have been always diftended with fluid; which is hardly ever the cafe in animals killed by privation of atmofpheric air.

Animals are deftroyed by the refpiration of mixtures of nitrous oxide and hydrogene nearly in the fame time as by pure nitrous oxide; they are capable of living for a great length of time in nitrous oxide mingled with very minute quantities of oxygene or common air. It appeared from experiment, that amphibious animals died in nitrous oxide in a much fhorter time than in hydrogene or pure water; confequently their death could not depend on the fimple priva-

 tion

tion of atmospheric air. Fishes lived rather longer in water saturated with nitrous oxide, than in water deprived of air by ebullition.

The second division of this *Research* relates to the changes effected in nitrous oxide, and other gases, by the respiration of animals. Previous to this inquiry, however, the effects of venous blood out of the body on nitrous oxide, were examined; and it was found, that when nitrous oxide is agitated in fluid venous blood, a certain portion of the gas is absorbed; whilst the colour of the blood changes from dark red to red purple.

2dly. That during the absorption of nitrous oxide by the venous blood, minute portions of nitrogene and carbonic acid are produced, either by evolution from the blood, or from a decomposition of part of the nitrous oxide.

3dly. That venous blood impregnated with nitrous oxide is capable of oxygenation; and vice versa; that oxygenated blood may be combined with nitrous oxide.

It appeared that nitrous oxide was rapidly absorbed by the venous blood in respiration, through the moist coats of the vessels. In these trials it was always found that nitrogene formed a part of the residuum. This production, the author conceives, is not owing to the decomposition of part of the nitrous oxide, in the aëriform state, *immediately* by the attraction of the red particles of venous blood for its oxygene; but that it is rather owing to a new arrangment produced in the principles of the impregnated blood during circulation; from which, becoming supersaturated with nitrogene, it gives it out through the moist coats of the vessels. In respiration of atmospheric air, the nitrogene it previously contained appeared to be diminished. On a full inspiration, 141 cubic inches of air were taken into the lungs; after expiration, they filled a space equal to 139 cubic inches nearly. These 139 inches analyzed were found

found to consist of 101 nitrogene; 32 oxygene; carbonic acid 6. The 141 cubic inches before inspiration were composed of 103 nitrogene, 1 carbonic acid, and 37 oxygene. After repeated trials of this kind it was found, that the quantity of oxygene absorbed was generally from 5 to 6 cubic inches; the carbonic acid formed, from 5 to 5.5; and the quantity of nitrogene apparently diminished by from 1 to 3 cubic inches. From some experiments on the respiration of oxygene gas, both by the author himself, and by the smaller quadrupeds, it appeared that considerably less oxygene is absorbed in a given time, than by the respiration of atmospheric air: whilst, at the same time, less carbonic acid is produced: this result was not to have been expected *a priori*, but no source of fallacy could be detected.

The 4th and last *Research* relates to the effects produced by the respiration of nitrous oxide, and of other gases, on the author himself. A considerable number of experiments are here recorded, and which were made with a degree of boldness bordering on temerity. The general effects produced by the nitrous oxide are thus described. 'Between May and July, I habitually breathed the gas, occasionally three or four times a day for a week together; at other periods, four or five times a week only.

'The doses were generally from six to nine quarts; their effects appeared undiminished by habit, and were hardly ever exactly similar. Sometimes I had the feelings of intense intoxication, attended with but little pleasure; at other time, sublime emotions connected with highly vivid ideas; my pulse was generally increased in fulness, but rarely in velocity.

'The general effects of its operation upon my health and state of mind, are extremely difficult of description; nor can I well discriminate between its agency and that of other physical and moral causes.

'I flept much lefs than ufual, and previous to fleep, my mind was long occupied by vifible imagery. I had a conftant defire of action, a reftleffnefs, and an uneafy feeling about the præcordia analogous to the ficknefs of hope.

'But perhaps thefe phenomena in fome meafure depended on the intereft and labour connected with the experimental inveftigation relating to the production of nitrous oxide, by which I was at this time inceffantly occupied.

'My appetite was as ufual, and my pulfe not materially altered. Sometimes for an hour after the infpiration of the gas, I experienced a fpecies of mental indolence pleafing rather than otherwife, and never ending in liftleffnefs.

'During the laft week in which I breathed it uniformly, I imagined that I had increafed fenfibility of touch: my fingers were pained by any thing rough, and the tooth edge produced from flighter caufes than ufual. I was certainly more irritable, and felt more acutely from trifling circumftances. My bodily ftrength was rather diminifhed than increafed.'

Many interefting experiments were made by the author, with a view of afcertaining whether any analogy exifted between the fenfible effects of the different gafes which are fooner or later fatal to life when refpired, and thofe of nitrous oxide. 'I refpired,' he obferves, 'four quarts of hydrogene nearly pure, produced from zinc and muriatic acid, for near a minute, my lungs being previoufly exhaufted, and my noftrils carefully clofed. The firft fix or feven infpirations produced no fenfations whatever; in half a minute, I perceived a difagreeable oppreffion of the cheft, which obliged me to refpire very quickly; this oppreffion gradually increafed, till at laft the pain of fuffocation compelled me to leave off breathing. I felt no giddinefs during or after the experiment; my pulfe was rendered feebler and quicker; and a

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by-ftander informed me that, towards the laft, my cheeks became purple.

'In a fecond experiment, when the hydrogene was procured from iron and diluted fulphuric acid, I was unable to refpire it for fo long as three quarters of a minute; a tranfient giddinefs and mufcular debility were produced, the pulfe was rendered very feeble, and the pain of fuffocation was greater than before.

'I breathed three quarts of nitrogene mingled with a very fmall portion of carbonic acid, for near a minute. It produced no alteration in my fenfations for the firft twenty feconds; then the painful fenfe of fuffocation gradually came on, and increafed rapidly in the laft quarter of the minute, fo as to oblige me to defift from the experiment. My pulfe was rendered feebler and quicker. I felt no affection whatever in the head.

'Mr. Watt's obfervations on the refpiration of diluted hydro-carbonate by men, and Dr. Beddoes's experiments on the deftruction of animals by pure hydrocarbonate, proved that its effects were highly deleterious.

'As it deftroyed life apparently by rendering the mufcular fibre inirritable without producing any previous excitement, I was anxious to compare its fenfible effects with thofe of nitrous oxide, which at this time I believe to deftroy life by producing the higheft poffible excitement, ending in læfion of organifation.

'In the firft experiment, I breathed for near a minute, three quarts of hydro-carbonate mingled with nearly two quarts of atmofpheric air. It produced a flight giddinefs and pain in the head, and a momentary lofs of voluntary power; my pulfe was rendered much quicker and feebler. Thefe effects, however, went off in five minutes, and I had no return of giddinefs.'

Emboldened by this trial, the author ventured to refpire pure hydro-carbonate, produced from the

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decompoſition of water by charcoal. Three inſpirations only were taken, before a terrible oppreſſion on the cheſt was perceived, followed by loſs of ſenſation and fainting. Repeated fits of giddineſs returned for an hour and half, and were ſucceeded by an excruciating pain in the forehead, which continued for many hours.

Some days after this he attempted to reſpire carbonic acid gas. 'I introduced,' he obſerves, 'into a ſilk bag four quarts of well waſhed carbonic acid produced from carbonate of ammoniac by heat, and after a complete voluntary exhauſtion of my lungs, attempted to inſpire it. It taſted ſtrongly acid in the mouth and fauces, and produced a ſenſe of burning at the top of the uvula. In vain I made powerful voluntary efforts to draw it into the windpipe; at the moment that the epiglottis was raiſed a little, a painful ſtimulation was induced, ſo as to cloſe it ſpaſmodically on the glottis; and thus in repeated trials I was prevented from taking a ſingle particle of carbonic acid into my lungs.

'I tried to breathe a mixture of two quarts of common air and three of carbonic acid, without ſucceſs; it ſtimulated the epiglottis nearly in the ſame manner as pure carbonic acid, and was perfectly non-reſpirable.

'I found that a mixture of three quarts of carbonic acid with ſeven of common air was reſpirable. I breathed it for near a minute. At the time, it produced a ſlight degree of giddineſs, and an inclination to ſleep. Theſe effects, however, very rapidly diſappeared after I had ceaſed to breathe, and no other affections followed.

'During the courſe of experiments on nitrous oxide, I ſeveral times breathed oxygene procured from manganeſe by heat, for from three to five minutes.

'In reſpiring 8 or 10 quarts; for the firſt two or three minutes I could perceive no effects. Towards the end,

end, even when I breathed very slowly, my respiration became oppressed, and I felt a sensation analogous to that produced by the want of fresh air; though but little of the oxygene had been consumed.

'In one experiment when I breathed from and into a bag containing 20 quarts of oxygene for near six minutes; Dr. Kinglake felt my pulse, and found it not altered in velocity, but rather harder than before. I perceived no effects but those of oppression on the chest.

'Having observed in my experiments upon venous blood, that nitrous gas rendered that fluid of a purple tinge, very like the colour generated in it by nitrous oxide; and finding no painful effects produced by the application of nitrous gas to the bare muscular fibre, I began to imagine that this gas might be breathed with impunity, provided it were possible in any way to free the lungs of common air before inspiration, so as to prevent the formation of nitrous acid.

'On this supposition, during a fit of enthusiasm produced by the respiration of nitrous oxide, I resolved to endeavour to breathe nitrous gas.

'114 cubic inches of nitrous gas were introduced into the large mercurial airholder; two small silk bags of the capacity of seven quarts were filled with nitrous oxide.

'After a forced exhaustion of my lungs, my nose being accurately closed, I made three inspirations and expirations of nitrous oxide in one of the bags, to free my lungs as much as possible from atmospheric oxygene; then, after a full expiration of the nitrous oxide, I transferred my mouth from the mouth-piece of the bag to that of the airholder, and turning the stopcock, attempted to inspire the nitrous gas. In passing through my mouth and fauces, it tasted astringent and highly disagreeable; it occasioned a sense of burning in the throat, and produced a spasm of the

epiglottis

epiglottis so painful as to oblige me to desist instantly from attempts to inspire it. After moving my lips from the mouth-piece, when I opened them to inspire common air, aëriform nitrous acid was instantly formed in my mouth, which burnt the tongue and palate, injured the teeth, and produced an inflammation of the mucous membrane which lasted for some hours.

'As after the respiration of nitrous oxide in the experiments in the last research, a small portion of the residual atmospheric air remained in the lungs, mingled with the gas, after forced expiration; it is most probable that a minute portion of nitrous acid was formed in this experiment, when the nitrous gas was taken into the mouth and fauces, which might produce its stimulating properties. If so, perhaps I owe my life to the circumstance; for, supposing I had taken an inspiration of nitrous gas, and even that it had produced no positive effects, it is highly improbable, that by breathing nitrous oxide, I should have freed my lungs from it, so as to have prevented the formation of nitrous acid when I again inspired common air. I never design again to attempt so rash an experiment.

'In the beginning of September I often respired nitrous oxide mingled with different proportions of common air or oxygene. The effects produced by the diluted gas were much less violent than those produced by pure nitrous oxide. They were generally pleasant: the thrilling was not often perceived, but a sense of exhilaration was almost constant.'

A detail of the effects produced by the respiration of nitrous oxide upon different individuals is next given: they do not materially differ from those already described. This is followed by some general remarks on the subject. 'From the facts detailed in the preceding pages,' Mr. *Davy* observes, 'it appears that the immediate effects of nitrous oxide upon

on the living syſtem, are analogous to thoſe of diffuſible ſtimuli. Both increaſe the force of circulation, produce pleaſurable feeling, alter the condition of the organs of ſenſation, and in their moſt extenſive action deſtroy life.

'In the mode of operation of nitrous oxide and diffuſible ſtimuli, conſiderable differences, however, exiſt.

'Diffuſible ſtimuli act immediately on the muſcular and nervous fibre. Nitrous oxide operates upon them only by producing peculiar changes in the compoſition of the blood.

'Diffuſible ſtimuli affect that part of the ſyſtem moſt powerfully to which they are applied, and act on the whole only by means of its ſympathy with that part. Nitrous oxide in combination with the blood is univerſal in its application and action.'

'The various effects of nitrous oxide upon different individuals and upon the ſame individuals at different times, prove that its powers are capable of being modified both by the peculiar condition of organs, and by the ſtate of general feeling.

'Reaſoning from common phenomena of ſenſation, particularly thoſe relating to heat, it is probable that pleaſurable feeling is uniformly connected with a moderate increaſe of nervous action; and that this increaſe when carried to certain limits, produces mixed emotion or ſublime pleaſure; and beyond thoſe limits occaſions abſolute pain.

'Comparing the facts in the laſt diviſion, it is likely that individuals poſſeſſed of high health and little ſenſibility, will generally be leſs pleaſurably affected by nitrous oxide than ſuch as have more ſenſibility, in whom the emotions will ſometimes ſo far enter the limits of pain as to become ſublime; whilſt the nervous action in ſuch as have exquiſite ſenſibility, will be ſo much increaſed as often to produce diſagreeable feeling.

'Modification

'Modification of the powers of nitrous oxide by mixture of the gas with oxygene or common air, will probably enable the most delicately sensible to respire it without danger, and even with pleasurable effects: heretofore it has been administered to such only in its pure form, or mingled with small quantities of atmospheric air, and in its pure form, even the most robust are unable to respire it with safety for more than five minutes.

'The muscular actions sometimes connected with the feelings produced by nitrous oxide, seem to depend in a great measure upon the particular habits of the individual; they will usually be of that kind which is produced either by common pleasurable feelings, or strong emotions.

'Hysterical affection is occasioned by nitrous oxide, probably only in consequence of the strong emotion produced, which destroys the power of the will, and calls up series of automatic motions formerly connected with a variety of less powerful but similar feelings.

'The quickness of the operation of nitrous oxide will probably render it useful in cases of extreme debility produced by deficiency of common exciting powers. Perhaps it may be advantageously applied mingled with oxygene or common air, to the recovery of persons apparently dead from suffocation by drowning or hanging.

'The only diseases in which nitrous oxide has been hitherto employed, are those of deficient sensibility.— An account of its agency in paralytic affections will be speedily published by Dr. Beddoes.'

A concise mention is made in an appendix, of a few experiments made on the growth of plants in different gases. 'Hydro-carbonate was the only air which seemed to promote vegetation.' In all the others, the plants withered sooner than in atmospheric air.

ART. LIV. *Medical Inquiries and Obſervations; containing an Account of the Yellow Fever, as it appeared in Philadelphia in* 1797; *and Obſervations upon the Nature and Cure of the Gout and Hydrophobia. By* BENJAMIN RUSH, *M.D. Profeſſor of Medicine in the Univerſity of Pennſylvania.* Vol. V. 8vo. 236 Pages. Price 5s. Philadelphia, 1798. Imported by J. MAWMAN, London.

IT is matter of regret to Britiſh practitioners, that the publications of the *American* Continent ſo tardily and ſparingly find their way to this country. No where, perhaps, is the ſcience of Medicine cultivated with greater ardour, nor phyſicians leſs ſhackled by the dogmas of the ſchools. The freedom of inquiry which characterizes moſt of their reſearches, though it may favour in ſome degree the growth of ſpeculation and hypotheſis, is calculated ultimately to aid the progreſs of ſcience. The former labours of Dr. *Ruſh*, on the ſubject of the Yellow Fever (a ſubject that has yet loſt no part of its intereſt), attracted an ample ſhare of our notice at the time;* and the later viſitations of this fatal malady ſeem to have confirmed, in a great meaſure, the obſervations of this celebrated phyſician. It is to be lamented, however, that ſuch a multiplicity of experience ſhould not yet have removed the wide difference in ſentiment, which, from the firſt, has exiſted among the practitioners of Philadelphia and other places, both with regard to the origin, and the treatment, of the diſeaſe. Nor is there any hope that the difference will be ſoon reconciled. A wider experience, and obſervers leſs influenced by private and perſonal conſiderations, are probably wanting, to ſettle the many diſputed points which ſubſiſt at preſent.

* *Vide* Med. and Chir. Rev. v. 1, p. 169.

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In the commencement of the work before us, Dr. *Rush* gives an account of the weather, and diseases which preceded the yellow fever of 1797, in the years 1795 and 1796. The predisposing causes of the fever were the same as in the year 1793. Strangers were, as usual, most subject to it. The heat of the body in such persons, in the West Indies, has been found to be between 3 and 4 degrees above that of the temperature of the natives. This fact is taken notice of by Dr. *M'Kittrick*, and to this he ascribes, in part, the predisposition of new comers to the yellow fever.

The same plan is followed in describing the symptoms of the disease that was adopted on the former occasion; that is, as they affected the blood-vessels, the excretions, the nervous system, the senses, the lymphatic system, the skin, and the blood. In all these, the variation from the fever of 1793 was not great. The acrimony of the contents of the stomach was manifest in two instances, where Dr. *Stewart* ventured to taste the black matter which was discharged by vomiting. In both cases it blistered his tongue. The mind, it was observed, was seldom affected with delirium after the loss of blood; and patients frequently died of convulsions where blood-letting had not been used. Dr. Stewart observed, that, in those cases in which the serum of the blood had a yellow colour, it imparted a saline taste only to his tongue. He was the more struck with this fact, as he had perceived a strong bitter taste upon his skin in a severe attack of the yellow fever in 1793.

The following states, or forms, the author remarks, were observable in the fever: '1. In a few cases the contagion or miasmata produced death in four-and-twenty hours, with convulsions, coma, or apoplexy.

'2. There were OPEN cases, in which the pulse was full and tense, as in a pleurisy or rheumatism, from the beginning to the end of the fever. They were generally attended with a good deal of pain.

'3. There

'3. There were depressed or LOCKED cases, in which there were a sense of great debility, but little or no pain; a depressed and slow pulse, a cool skin, cold hands and feet, and obstructed excretions.

'4. There were DIVIDED or MIXED cases, in which the pulse was active until the 4th day, after which it became depressed. All the other symptoms of the locked state of the fever accompanied this depressed state of the pulse.

'5. There were cases in which the pulse imparted a perception like that of a soft and SHATTERED quill. I have before mentioned that this state of the pulse occurred in Dr. Jones and Dr. Dobell. I felt it but once, and on the day of his attack, in the latter gentleman, and expressed my opinion of his extreme danger to my son, upon my return from visiting him. I did not meet with a case which terminated favourably where I perceived this SHATTERED pulse. A disposition to sweat occurred in this state of the fever.

'6. There were what Dr. Caldwell happily called WALKING cases. The patients here were flushed, or pale, had a full or tense pulse, but complained of no pain; had a good appetite, and walked about their rooms or houses, as if they were but little indisposed, until a day or two, and in some instances until a few hours, before they died. The impression of the remote cause of the fever, in these cases, was beyond sensation; for, upon removing a part of it by bleeding or purging, the patients complained of pain, and the excitement of the muscles passed so completely into the blood-vessels and alimentary canal, as to convert the fever into a common and more natural form.— These cases were always dangerous, and, when neglected, generally terminated in death. Mr. Brown's fever came on in this insidious shape. It was cured by the loss of upwards of 100 ounces of blood, and a plentiful salivation.

'7. There was the INTERMITTING form in this fever. This, like the last, often deceived the patient, by

by leading him to suppose his disease was of a common or trifling nature. It prevented Mr. Richard Smith from applying for medical aid, in an attack of the fever, for several days, by which means it made such an impression upon his viscera, that depleting remedies were in vain used to cure him. He died in the prime of life, beloved and lamented by a numerous circle of relations and friends.

'8. There was a form of this fever in which it resembled the mild remittent of common seasons. It was distinguished from it chiefly by the black colour of the intestinal evacuations.

'9. There were cases of this fever so light, that patients were said to be neither *sick* nor *well;* or, in other words, they were sick and well half a dozen times in a day. Such persons walked about, and transacted their ordinary business, but complained of dulness, and, occasionally, of shooting pains in their heads. Sometimes the stomach was affected with sickness, and the bowels with diarrhœa or costiveness. All of them complained of night sweats. The pulse was quicker than natural, but seldom had that convulsive action which constitutes fever. Purges always brought away black stools from such patients, and this circumstance served to establish its relationship to the prevailing epidemic. Now and then, by neglect or improper treatment, it assumed a higher and more dangerous grade of the fever, and became fatal; but it more commonly yielded to nature, or to a single dose of purging physic.

'10. There were a few cases in which the skin was affected with universal yellowness, but without more pain or indisposition than usually occurs in the jaundice. They were very frequent in the year 1793, and generally prevail in the autumn, in all places subject to bilious fever.

'11. There were CHRONIC cases of this fever.—It is from the want of observation that physicians limit the duration of the yellow fever to certain days. I have seen

ſeen many inſtances in which it has been protracted into what is called by authors a ſlow nervous fever.—The wife of Captain Peter Bell died of a black vomiting, after an illneſs of nearly one month. Dr. Pinckard, formerly one of the phyſicians of the Britiſh army in the Weſt Indies, in a late viſit to this city, informed me, that he had often ſeen the yellow fever put on a chronic form in the Weſt India Iſlands.'

The gentleman above named (Dr. *Pinckard)* obſerves further of the yellow fever, as it appeared among the troops in *Guiana* and the Weſt India Iſlands, that, in the years 1796 and 1797, it exhibited ſuch perpetual inſtability, and varied ſo inceſſantly in its character, that he could not diſcover any one ſymptom to be decidedly diagnoſtic; and hence he was led into an opinion that the yellow fever, ſo called, is not a diſtinct or ſpecific diſeaſe, but merely an aggravated degree of the common remittent or bilious fever of hot climates, rendered irregular in form, and augmented in malignity, from appearing in ſubjects unaccuſtomed to the climate.

The moderate caſes of the diſeaſe were few, compared with thoſe of a malignant and dangerous nature; and, on this account, the mortality was greater in the ſame number of patients who were treated with the ſame remedies, than it was in the years 1793 and 1794. Several perſons were affected with it who had been attacked in 1793. Its power of affecting by contagion is admitted. It is is ſaid to have been produced in two cats, who licked up ſome milk diſcharged from the mouth of a perſon under a ſalivation for the diſeaſe. They both ſickened immediately with the ſymptoms of fever, and died; one on the 4th, and the other on the 7th day afterwards.

A conſiderable number of pages is allotted to prove the domeſtic origin of the diſeaſe, in oppoſition to the ſentiments of the College of Phyſicians, who referred its ſource to imported contagion.* In this opinion,

* See page 185 of our laſt Volume.

it is proper to obſerve, Dr. *Ruſh* is not ſingular, a conſiderable number of phyſicians, aſſociated under the title of the *Academy of Medicine*, having concurred in the ſame ſentiment. This difference of opinion on a very important point, is greatly to be lamented; eſpecially if it be true, as the author ſuggeſts, that a bias to one ſide of the queſtion has cauſed a neglect of cleanlineſs, and the means of removing the accumulating filth of a large city; ſufficient cauſes of the aggravation, if not of the production, of the fatal malady.

The mode of treatment purſued by the author was in general the ſame as in the fevers of 1793 and 1794. He began the cure, in moſt caſes, by bleeding, where he was called on the firſt day of the diſeaſe, and with the uſual ſalutary effects. On the ſecond day it frequently failed of doing ſervice; and on the ſubſequent days of the fever, he believes it often did harm, more eſpecially if no other depleting remedy had preceded it. Blood was always drawn in large quantity, regarding only the violence of the diſeaſe, and not the more or leſs robuſt habit of the patient. In ſeveral caſes, above an hundred ounces of blood were taken away.

Blood-letting was followed by purgatives and mercurials. The author obſerves, that he loſt but two patients in whom the mercury excited a ſalivation.—The uſe of emetics ſeems to have been dubious. The advantages of a weak vegetable diet were very great in this fever. The premature uſe of animal food frequently occaſioned relapſes. Bark was not at all employed.

During the exiſtence of the premonitory ſymptoms, and before the patients were confined to their rooms, a gentle purge, or the loſs of a few ounces of blood, is ſaid to have prevented the formation of the fever in many hundred inſtances, and that without a ſingle exception.

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The following remarks occur on the general treatment of the disease in the city of Philadelphia.—'From the more malignant state of the fever, and from the fears and prejudices that were excited against bleeding and mercury by means of the newspapers, the success of those remedies was much less than in the years 1793 and 1794. Hundreds refused to submit to them at the *time*, and in the *manner* that were necessary to render them effectual. From the publications of a number of physicians who used the lancet and mercury in their greatest extent, it appears that they lost but one in ten of all they attended. It was said of several practitioners who were opposed to copious bleeding, that they lost a much smaller proportion of their patients with the prevailing fever. Upon inquiry, it appeared they had lost many more. To conceal their want of success, they said their patients had died of other diseases. This mode of deceiving the public began in 1793. The men who used it, did not recollect, that it is less in favour of a physician's skill to lose patients in pleurisies, colics, hæmorrhagies, contusions, and common remittents, than in a malignant yellow fever.

'Dr. Sayer attended fifteen patients in the disease, all of whom recovered by the plentiful use of the depleting remedies. His place of residence being remote from those parts of the city in which the fever prevailed most, prevented his being called to a greater number of cases.

'A French physician, who bled and purged *moderately*, candidly acknowledged, that he saved but three out of four of his patients.

'In the city hospital, where bleeding was sparingly used, and where the physicians depended chiefly upon a salivation, more than one half died of all the patients who were admitted. It is an act of justice to the physicians of the hospital, to add, that many, perhaps most, of their patients were admitted *after* the first

day of the difeafe.'——The ftimulating plan was deferted by every phyfician in the city.

Having concluded the fubject of the yellow fever, the author proceeds to the fecond fubject of his Inquiry, the *Gout.** This he confiders as a difeafe of the whole fyftem, and primarily affecting the folids only. In his opinion, it is always induced by general predifpofing direct or indirect debility. The remote caufes of this debility are indolence, intemperance, and the others commonly affigned. The exciting caufes are frequently a greater degree, or a fudden application, of its remote and predifpofing caufes. Thefe are fuppofed to act upon the accumulated excitability of the fyftem, and by deftroying its equilibrium of excitement, and regular order of actions, produce convulfion, or irregular morbid and local excitement. Thefe exciting caufes, the author goes on to obferve, are either of a ftimulating, or of a fedative nature. The former are violent exercife, excefs of various kinds, external injuries, and the like; the latter are fudden inanition from bleeding, purging, &c.; cold, fear, &c.

The proximate caufe is thus ftated:—' The proximate caufe of the gout, *as of all other difeafes*, is morbid excitement, accompanied with irregular action, or the abfence of all action from the force of ftimulus. There is nothing fpecific in the morbid excitement and actions which take place in the gout different from what occur in fevers. However varied morbid actions may be by their caufes, feats, and effects, they are all of the fame; and the time will probably come, when the whole nomenclature of morbid actions will be abforbed in the fingle name of *difeafe*.'

We much doubt how far this explanation of a confeffedly difficult fubject will be generally fatisfactory.

* Dr. *Rufh*'s remarks on this fubject were flightly noticed in our laft Vol. p. 494.

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To us it involves many difficulties, and is not free from contradictions. If the term *excitement* be employed to fignify the ftate of living action, according to the Brunonian principles, of which the author profeffes himfelf an admirer, there will be no hefitation in admitting gout to be a ftate of morbid excitement, that is, morbid action; but that this ftate of action has nothing peculiar or fpecific, is what few will believe who look to the peculiarity of its fymptoms, and the morbid changes of ftructure it frequently occafions. The reduction of all morbid actions to one clafs is calculated, no doubt, to abridge the labour of ftudents, and to make them enter on the practice of medicine with confident boldnefs, but is little adapted to the various faculties and powers of the fyftem, and probably as little likely to improve the healing art. Simplicity is not fo defirable, that we fhould purchafe it at the expence of Nature and Truth.

The author next proceeds to enumerate the fymptoms of the difeafe, as they appear in the ligaments, the blood-veffels, the vifcera, the nervous fyftem, the alimentary canal, the lymphatics, the fkin, and the bones. In the arterial fyftem, it is endeavoured to be fhewn, that the gout occafions fever, and that it puts on all the different grades of fever, from the malignity of the plague, to the mildnefs of a common intermittent. Indeed, with the latitude the author takes, there is hardly any difeafe which might not be reduced under the name of gout.

With refpect to the *cure*, the author entertains the moft fanguine ideas. ' Let not the reader ftartle when I mention curing the gout. It is not a facred difeafe. There will be no profanity in handling it freely. It has been cured often, and I hope to deliver fuch directions under this head, as will reduce it as much under the power of medicine, as a pleurify or an intermitting fever.' Who does not recollect the

almost similar language of *Sydenham,* with regard to the use of horse-exercise in consumption? Yet consumptions still prevail among us with undiminished fatality.

The remedies suggested for the gout are divided into the following heads. I. Such as are proper in its approaching, or forming state.

II. Such as are proper in *violent* morbid action in the blood-vessels, and viscera.

III. Such as are proper in a *feeble* morbid action in the same parts of the body.

IV. Such as are proper to relieve certain local symptoms which are not accompanied by general morbid action, and

V. Such as are proper to prevent its recurrence, or, in other words, to eradicate it from the system.

In the forming state, the system is supposed to be in a state of debility, when the disease may easily be prevented by the loss of a few ounces of blood, or a gentle dose of physic. In the state of violent action, copious blood-letting is advised, on the ground of the author's experience, and that of others. Purging, also, is recommended. Cool and cold air are highly spoken of, as is cold water to the affected part, and which is said to have been used with safety and instant removal of pain.

In the feeble state of gout, which is attributed to the neglect or too scanty use of evacuations in the first stage, stimulants and opiates are recommended; and in case of failure of these, salivation by mercury is advised as speedily as possible. 'The mercury, when used in this way, brings into action an immense mass of latent excitement, and afterwards diffuses it equally through every part of the body.'——Is this, we would ask, very intelligible?

The last essay in the volume before us contains Observations on the Nature and Cure of *Hydrophobia.* Under this term, are included a variety of anomalous

lous cases recorded by authors, and in which a dread of swallowing liquids took place amongst other symptoms. But these, probably, have little real relation to the hydrophobia excited by the bite of rabid animals. We find the author here again considering the disease as a *malignant state of fever.* This opinion he is induced to adopt from observing, 1st. that the disease in all rabid animals is a fever, as manifest by the symptoms they exhibit.

In the second place, that the disease produced in the human species by the bite of a rabid animal is a *malignant* fever, appears, he thinks, from its symptoms. ' These, as recorded by *Aurelian*, *Mead*, *Fothergill*, *Plummer*, *Arnold*, *Baumgarten*, and *Morgagni*, are chills, great heat, thirst, nausea, a burning sensation in the stomach, vomiting; costiveness—a small, quick, tense, irregular, intermitting, natural, or slow pulse—a cool skin, great sensibility to cold air, partial cold and clammy sweats on the hands, or sweats accompanied with a warm skin diffused all over the body, difficulty of breathing, sighing, restlessness, hiccup, giddiness, head-ache, delirium, coma, false vision, dilatation of the pupils, dulness of sight, blindness, glandular swellings, heat of urine, priapism, palpitation of the heart, and convulsions.—I know that there are cases of hydrophobia upon record, in which there is said to be a total absence of fever. The same thing has been said of the plague. In both cases the supposed absence of fever is the effect of stimulus acting upon the blood-vessels with so much force as to suspend morbid action in them. By abstracting a part of this stimulus, a fever is excited, which soon discovers itself in the pulse and on the skin, and frequently in pains in every part of the body. The dread of water, and the great sensibility of the system to cold air, are said to give a specific character to the hydrophobia; but the former symptom, it has been often seen, occurs in diseases from other causes, and the latter has been frequently observed in the

yellow fever. It is no more extraordinary that a fever excited by the bite of a rabid animal fhould excite a dread of water, than that fevers from other caufes fhould produce averfion from certain aliments, from light, and from founds of all kinds; nor is it any more a departure from the known laws of ftimulants, that the faliva of a mad dog fhould affect the fauces, than that mercury fhould affect the falivary glands. Both ftimuli appear to act in a fpecific manner.

'The hydrophobia partakes of the character of a malignant fever in appearing at different intervals from the time in which the infection is received into the body. Thefe intervals are from one day to five or fix months. The fmall-pox fhews itfelf in intervals from 8 to 20 days, and the plague and yellow fever from the moment in which contagion is inhaled, to nearly the fame diftance of time. This latitude in the periods at which infectious and contagious matters are brought into action in the body, muft be refolved into the influence which the feafon of the year, the habits of the patients, and the paffion of fear, have upon them.

'Blood drawn in the hydrophobia exhibits the fame appearances which have been remarked in malignant fevers. In Mr. *Bellamy*, the gentleman whofe cafe is fo minutely related by Dr. *Fothergill*, the blood difcovered with "flight traces of fize, *ferum*, remarkably *yellow*." It was uncommonly fizy in a boy of Mr. *George Oakley*'s, whom I faw and bled for the firft time, on the fourth day of his difeafe, in the beginning of the year 1797. His pulfe imparted to the fingers the fame kind of quick and tenfe ftroke which is common in the open forms of the yellow fever. He died in convulfions the next day. He had been bitten by a mad dog on one of his temples, three weeks before he difcovered any figns of indifpofition.

'The hydrophobia accords exactly with malignant fevers in its duration. It generally terminates in death,

death, according to its violence, and the habit of the patient, on the first, second, third, fourth, or fifth day, from the time of its attack, and with the same symptoms which attend the last stage of malignant fevers.

'The body, after death, from the hydrophobia, putrefies with the same rapidity, that it doth after death from a malignant fever, in which no depletion has been used.

'Dissection of bodies which have died of the hydrophobia, exhibit the same appearances which are observed in the bodies of persons who have perished of malignant fevers. The appearances, according to *Morgagni* and *Tauvry*, are marks of inflammation in the throat, œsophagus, brain, stomach, liver, and bowels. Effusions of water, and congestions of blood in the brain, large quantities of dark-coloured or black bile in the gall-bladder and stomach, mortifications in the bowels and bladder, livid spots on the surface of the body, and, above all, the arteries filled with fluid blood, and the veins nearly empty. I am aware that two cases of death from hydrophobia are related by Dr. *Vaughan*, in which no appearance of disease was discovered by dissection in any part of the body. Similar appearances have occasionally been met with in persons who have died of malignant fevers. I have explained them in my lectures, by calling the attention of my pupils to what constituted a disease. It is morbid action. Now this action is often so violent as to prevent inflammation. We err, therefore, when we place disease in inflammation, for it is one of its primary effects only; and hence we observe it does not take place in many instances in malignant fevers, until the arteries are so far relaxed by two or three bleedings, as to be able to relieve themselves by effusing red blood into serous vessels, and thus to produce that *error loci* which I have elsewhere supposed to be essential to inflammation. The existence of this grade of action in the arteries

may

may always be known by the prefence of fizy blood, and by the more obvious and common fymptoms of fever.'

With refpect to the treatment of hydrophobia, the author divides it into two fpecies, the preventive, and the curative. The former is that ufually followed by writers. The chief remedy advifed for the cure is blood-letting, and that in the moft liberal manner. Several cafes are brought forwards, from different authorities, in proof of the fuccefs of this remedy; but none on the author's own experience. Purges and mercurials, and the other remedies employed in fever, are alfo here advifed.

We may obferve, with regard to blood-letting, that many of the cafes adduced in its favour, were anomalous ones; and it has certainly often failed in clear cafes of the difeafe.

ART. LV. *Obfervations on the Origin of the Malignant Bilious, or Yellow Fever in Philadelphia, and upon the Means of preventing it: addreffed to the Citizens of Philadelphia. By* BENJAMIN RUSH. Octavo, 28 pages. Price 1s. Philadelphia, 1799. Imported by J. MAWMAN, Poultry, London.

WE have already noticed the difference of opinion that prevails amongft the *Tranfatlantic* phyficians, with refpect to the origin of the peftilential fever which has fo long defolated thofe regions. In the pamphlet before us, we find Dr. *Rufh* again ftrenuoufly maintaining its domeftic origin, after having for fix years laboured in vain to effect his purpofe. This difeafe, the yellow fever, he maintains, is the offspring of putrid vegetable and animal exhalations in all countries, though it prevails only in hot climates and

feafons.

feafons. Thefe, he obferves, abound in Philadelphia, in the docks, the foul air of fhips, the common fewers and gutters, in the cellars, yards, &c., and in the impurity of their pump water. All phyficians agree in referring the common bilious fever and dyfentery to thefe fources; and as thefe difeafes are faid lately to have much diminifhed, and as the putrid exhalations ftill continue, the prefumption is, the author thinks, that they produce the higher *grade* of bilious fever, which is the yellow fever.

In anfwer to the objection that has been made, viz. that although the caufes affigned muft always have exifted, yet the fever only made its appearance in 1793, Dr. *Rufh* obferves, that a certain conftitution of the air is neceffary, in addition to noxious exhalations; and he refers to the analogy which the plague and other malignant difeafes offer in this refpect. The ceffation of the difeafe he refers in part to the effect of habit; the fyftem accommodating itfelf in time to various hurtful impreffions.

With regard to the contagious nature of the yellow fever, he remarks, that contagion is of two kinds; one *fecreted*, as in fmall-pox, meafles, &c.; the other, derived from certain matters difcharged from the body, and which *afterwards*, by ftagnation or confinement, undergo fuch a change, as to partake of the fame nature as the putrid exhalations which produce the fever. In this way, he thinks, the yellow fever may be faid to be contagious.

The importation of the difeafe from the Weft Indies is denied, on the ground that it is not even there contagious. This is afferted on the authority of feveral phyficians, as *Huck*, *Hillary*, *Hunter*, *M'Lean*, and *Clark;* to thefe are added the names of Drs. *Jackfon*, *Pinckard*, *Borland*, and *Scott*, lately phyficians to the army in the Weft Indies. The fhip, jail, and hofpital fever, Dr. *Rufh* obferves, is one and the fame difeafe. It is produced by exhalations from *living* bodies in a crowded, filthy, or debilitated

debilitated ſtate. It is ſometimes confounded with the yellow fever by writers, but is materially different from it.——Thus it would ſeem, according to this account, that the exhalations of the body by ſtagnation ſometimes produce yellow fever, and at others the jail or hoſpital fever; two diſeaſes allowed by the author to be materially different. There is ſurely an inconſiſtency in this.

That the yellow fever does not ſpread chiefly by contagion, is manifeſt, the author thinks, from the diſeaſe having been checked in three different years by froſty nights, which act only upon the putrid exhalations which float in the atmoſphere. The means of prevention here adviſed turn, of courſe, chiefly on cleanlineſs and ventilation; means of almoſt equal importance in either view of the queſtion. In the preſent unſettled ſtate of the public opinion, precautions of all kinds ſhould, no doubt, be ſtrictly attended to and enforced.

ART. LVI. *An Eſſay on the malignant peſtilential Fever introduced into the Weſt India Iſlands from Boullam, on the Coaſt of Guinea, as it appeared in* 1793-4-5-*and*-6. *Interſperſed with Obſervations and Facts, tending to prove that the Epidemic exiſting at Philadelphia, New York, &c., was the ſame Fever introduced by Infection imported from the Weſt India Iſlands; and illuſtrated by Evidences founded on the State of thoſe Iſlands, and the Information of the moſt eminent Practitioners reſiding on them. By* C. CHISHOLM, *M.D. and Inſpector-General of the Ordnance Medical Department in the Weſt Indies.* 2d Edition, much enlarged. 8vo. 2 Vols. 1005 pages. Price 16s. London, 1801. MAWMAN.

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THE former edition of this work was noticed at ſome length in our firſt Volume;* the preſent, the reader will perceive, is very materially enlarged; and, we may add, affords additional proof of the truth of the obſervations then advanced. As the arrangement adopted by the author on the preſent occaſion differs altogether from the preceding, we ſhall preſent our readers with its general outline.

The work is divided into four parts, the firſt of which contains an account of the origin, progreſs, diagnoſtic, cauſe, and other circumſtances of the pathology of the diſeaſe: the ſecond relates to the Means of Cure. In the third part, the important ſubject of Prevention is diſcuſſed; whilſt the fourth may be called the controverſial part, as it accounts for, and endeavours to obviate, the oppoſition which has been made to the author's mode of practice, and to his ideas concerning the nature and origin of the diſeaſe.

We have ſeen that Dr. *Chiſholm* conſiders the malignant peſtilential fever as totally different in its nature and origin from the yellow remittent bilious fever, which is endemic in the Weſt Indies. The diſtinction, however, has not always been properly made by practitioners; and hence has ariſen the widely-different ſtatements which have been made on the ſubject. The former owes its origin to the vitiated exhalations of the human body, and is contagious; whilſt the latter ariſes from the operation of marſh miaſmata on the ſyſtem, and is never found but in ſituations where theſe prevail: it is not contagious.—'At Grenada,' the author obſerves, 'a very ſingular diſtinction was exhibited between the *malignant peſtilential* and the *yellow remittent fevers.* The cauſes of the former had been cheriſhed in the retailing rum-ſhops, and the haunts of low diſſipation; and the ſtate

* P. 542.

of

of warfare that unhappy iſland had been involved in by an inſidious and cruel internal enemy, had ſuſpended the exerciſe of police; had permitted irregularity, uncleanlineſs, and the accumulation of infection, to exiſt; and had diverted the intention of the legiſlature from ſuch ſalutary laws and regulations as might have proved deſtructive to the means of diſſeminating the evil. The troops which were latterly, and ſucceſsfully, employed in the reſtoration of the iſland to tranquillity, were all, or principally, of Sir *Ralph Abercromby*'s army. One part of theſe, the 27th regiment, were, after the campaign, ſtationed on Richmond Hill; another, the 57th regiment, at a diſtant poſt, Gouyave. Theſe regiments were both healthy, and none of the men had been expoſed to infection before the diſtribution of their quarters. Soon after they became ſtationary, the morbid cauſes peculiar to each place began to exhibit their baneful influence; and the malignant peſtilential fever at St. George's and the adjoining fortreſſes, was not more deſtructive than the yellow remittent fever at Gouyave, and at ſome of the out-poſts. During the inſurrection, a ſimilar diſtinction was perceived to take place at Grenville Bay; for the troops occupying that poſt, at different times, being expoſed, under the moſt unfavourable circumſtances, to the miaſmata of the extenſive marſhes which nearly incloſe that unhealthy place, were ſeized with the diſeaſes which are their peculiar production, and chiefly by the yellow remittent fever; and a great many ſuffered by it. It is ſingular, however, that, although no doubt can be entertained of the diverſity of the diſeaſe I have ſtated, a mode of treatment, almoſt in every reſpect the ſame, was found neceſſary in both: and ſome medical gentlemen, impreſſed with the idea that one required bark and tonics, whilſt the other yielded only to mercury and appropriate antiphlogiſtics, were the indirect cauſe of the great mortality which took place in the 57th regiment, quartered at Gouyave.'

The

The further experience of the author appears to have fully eſtabliſhed the character of mercury, as the chief means of cure. He complains, however, that the practice met with much prejudiced oppoſition; to which he does not heſitate to attribute much of the fatality the diſeaſe manifeſted. ‘ The oppoſition which I have had, and have to contend with,’ he obſerves, ‘ in my endeavours to impreſs the truth of my ſentiments on the public mind, relative to the origin and cauſe of the propagation of the peſtilential infection, which has characterized the late direful epidemic; and to the mode of treatment which I, as well as every unprejudiced practitioner in the Weſt India Iſlands, have found the only ſucceſsful one, has proceeded from the agents of the Bulama Aſſociation in the firſt inſtance, and from the Medical Staff of the armies acting in the Weſt Indies ſubſequent to the year 1795. The attempts at refutation of the ſtrong facts which have occurred at Grenada, by the Bulama Aſſociation, are ſimilar to the aſſertions made by the writers for the Levant Company againſt the importation of infection into Great Britain immediately from Turkey. The firſt have imagined that their colonies on the coaſt of Africa might be injured; and the latter had fear of their trade ſuffering: we ſee, therefore, in both, intereſt overleaping every obſtacle, and ſhutting the door againſt truth. The conduct of the gentlemen compoſing the Medical Staff cannot ſo obviouſly be accounted for: was it neceſſary to exhibit cauſes for the wide devaſtation which took place in the military hoſpitals, we might expect a delineation of facts, tending to prove, that this proceeded from the faithful obſervation of the method recommended by me; but what ſhall we ſay, when we are told,— that the efficacy, and even danger, of this method, were inculcated at the commencement of the operations of the armies, and before caſes occurred on which trials might be made? It is not my intention to enter on the invidious taſk of diſplaying the real

cauſes

cauſes of the loſs of 13,437 ſoldiers, our countrymen, in a period little exceeding thirty months, by the Malignant Peſtilential and Yellow Remittent Fevers:—but I may, without incurring cenſure, aſk, why the mercurial treatment was not recurred to, when that adopted had ſo generally failed? No ſatisfaction will ariſe from being told, that much of the dreadful mortality which took place, proceeded from the latter of theſe diſeaſes; for the applicability of the queſtion to the nature of the event is not diminiſhed.'

Again—' It is univerſally known that the mercurial treatment was induſtriouſly condemned by thoſe placed in the direction of the hoſpitals, and a youthful, inexperienced, and docile Staff readily truſted, where attention, application, and denial of accuſtomed indulgence, would have been the price of ſucceſs. Were there a poſſibility of inaccuracy in this ſtatement, I would rejoice in ſuppreſſing it. I am perfectly open to conviction, and feel no enmity to any individual of the Staff; but juſtice to myſelf, and humanity, ſhuddering at the deſtruction of nearly the whole of the Weſt India army, call upon me to declare, that there is undoubted authority for ſtating, that, notwithſtanding the total inefficacy of the remedies generally employed in the general hoſpitals, the practice deſcribed by me was not recurred to by more than three army phyſicians, in a fair and judicious manner. Two of theſe gentlemen are unhappily no more; but Dr. *Wright* is a living monument of the advantages which reſult from the employment of mercury, conducted by candour, by profeſſional ſkill, and by judgment. This gentleman's report has been made public, and the world unite in the eulogium of the author.'

' The abſurd conduct of the Medical Board at home, at the time Sir Ralph Abercromby's army was formed, is chiefly reprehenſible; and may very juſtly be conſidered as an extenuation of the inexperience, the folly, or the crime, of the younger members of the

the Medical Staff of that army. In the name of common fenfe, let me afk,—what ufeful purpofes could arife from a regulation which precluded all from exercifing the important functions of an army phyfician, but fuch as derived their medical knowledge from feminaries where none can be obtained; or fuch as were, or became, licentiates of the London College of Phyficians? What had an *Oxford* or a *Cambridge* degree—what had a licence to practife within feven miles of London—to do with medical practice within the tropics? Can the whole of that learned body united, communicate that experience in the treatment of inter-tropical fevers, which can be acquired only by a long and painful attention to them in the torrid regions where they are endemic? This fingular infatuation, by which the order of things was inverted, proceeded from views beft known to the triumvirate themfelves; but its effects may be confidered as the remote caufe of all the misfortunes which befel the devoted troops compofing the army under the command of Sir Ralph Abercromby. Our country, therefore, have inexpugnable reafons for configning a board, whofe refolves and regulations militate fo forcibly againft the fober dictates of common fenfe, and whofe felf-fufficiency has given exiftence to a cloud which obfcures the moft manifeft proofs of the baleful tendency of their meafures, to the fate of the unhappy victims who have fallen under the operation of both.'

In an appendix, the author relates fome experiments made for the purpofe of afcertaining the Degree of Animal Heat within the Tropics. In twelve Europeans, newly arrived from Great Britain and Ireland, and of courfe totally unaffimilated to the climate, whofe ages varied from 16 to 28 years, and who were in perfect health, the thermometer placed in the arm-pits, gave, as a mean of the whole, 96° of

 heat,

heat, whilſt at the ſame time the mean pulſe amounted to 82.

The ſame number of Europeans, whoſe reſidence in the tropical climate varied from 4 to 20 years, gave the following reſult: mean heat, 96°; mean pulſe, 70.

Twelve robuſt negro men, natives of the Gold Coaſt in Africa, only a fortnight in the country, gave as follow: mean heat, 97-5°; mean pulſe, 88.

In the ſame number of negroes, who had reſided in the Weſt Indies from 4 to 20 years, the mean heat was 96-5°; mean pulſe, 82.

In twelve other negroes, creoles, or natives of the Weſt Indies, whoſe ages varied from 16 to 30, the mean heat was 98°; mean pulſe, 85.

The general reſult, as ſtated by the author, is, ' 1. That the European, whether aſſimilated or unaſſimilated to the tropical climate, poſſeſſes, in the tropical climate, in health, one and a half degrees of heat leſs than in his native country; and nearly two degrees leſs than the negro. 2. That the unaſſimilated negro of Africa, and the creole negro of South America, born under the ſame parallel of north latitude, poſſeſs nearly the ſame degree of heat. 3. That the aſſimilated negro of Africa, in South America, poſſeſſes nearly the ſame degree of heat that the aſſimilated European does; but one degree leſs than the unaſſimilated negro of Africa, and one degree and a half leſs than the creole negro of South America. 4. That the circumſtance of extreme age, and extreme youth, make no difference in the temperature of the human body in a tropical climate. And, 5. That the mean heat of ſixty-ſeven perſons of different countries, different climates, different temperaments, different ages, and of every ſhade of colour from white to black, is 97°, or that which is the mean heat obſerved in the human body in health and vigour in Great Britain.'

' Morbid heat appears,' the author obſerves, ' under certain forms of fever, much greater within the tropics

tropics than in Europe. A variety of obſervations on the degrees of morbid heat in the ſimple remittent and formidable yellow remittent fevers, prove, that, during the inflammatory ſtate or ſtage of the firſt, the heat varies from 99° to 105°; and during that of the ſecond, from 102° to 112°; and that, during the remiſſions and low comatous ſtate, the heat ſinks frequently to 93° and 94°. What it is immediately before death I have not aſcertained. It is not often, however, very high degrees of morbid heat occur; and the 112th has been aſcertained in only two caſes:'——of theſe, one recovered.

Before quitting the preſent edition, we would obſerve, that the quantity of new matter it contains, as well as the improved arrangement it has undergone, entitle it to be conſidered, in a great meaſure, as an original work: and we are of opinion, that there are few treatiſes where an equal variety of important matters has been brought under view, or which promiſe more utility in the peruſal.

ART. LVII. *An Eſſay on Phlegmatia Dolens, including an Account of the Symptoms, Cauſes, and Cure of Peritonitis Puerperalis and Conjunctiva. By* JOHN HULL, *M.D.* Octavo, 362 pages. Price 6s. 6d. Mancheſter, 1800. BICKERSTAFF. London.

THE term *phlegmatia dolens* is employed by the author to deſignate that ſpecies of ſwelling which now and then occurs in one of the inferior extremities of women ſhortly after child-birth, and which is characterized by a tenſe, elaſtic, hot, and painful tumour, that generally extends itſelf rapidly over the whole of the limb; the ſkin retaining its nural colour, or even becoming white, and preſent-

ing more or leſs of a ſhining appearance. The occaſional ſeverity of the complaint, as being frequently attended with alarming febrile ſymptoms, and now and then terminating fatally, may, perhaps, juſtify the laboured diſcuſſion of the ſubject here entered into.

In the firſt chapter, the author treats of the *literary* hiſtory of *phlegmatia dolens*, noticing the different accounts of writers, from the time of Hippocrates to the preſent day; with a review of the various theories that have been adopted with regard to it. Moſt of the early writers on the ſubject conſidered the diſeaſe as depending either on a ſuppreſſion of the lochial diſcharges, or on a depoſition of the milk on the affected parts: but in the preſent ſtate of pathology, little pains are wanting to overturn theſe hypotheſes. In the year 1784, Mr. *White* publiſhed an 'Inquiry into the Nature and Cauſe of that Swelling in one or both of the lower Extremities, which ſometimes happens to Lying-in Women.' In this treatiſe, he attributes the proximate cauſe of the diſeaſe to an obſtruction, detention, and accumulation of lymph in the limb; and imagines the lymphatics to be obſtructed as high at leaſt as where they enter the pelvis under *Poupart's* ligament, in conſequence of ſome accident happening during labour, or ſome ſtate peculiar to child-bed: he conceives it might probably ariſe from the continued preſſure of the lymphatic veſſels by the child's head, on the brim of the pelvis, and which might be followed by rupture of theſe veſſels in ſome part of their courſe. Mr. *Trye,* of Glouceſter, in the year 1792, publiſhed an 'Eſſay on the Swelling of the lower Extremities incident to Lying-in Women,' in which he alſo attributes the diſeaſe to an obſtruction of the lymphatics, but which he thinks originates in inflammation of a trunk or trunks of theſe veſſels, or ſimply to ſuch an affection of the lymphatic glands themſelves. This inflammation, he ſuppoſes, may ariſe from preſſure, or from abſorbed acrimonious matter.

But

But the chief ſtrictures of the author are reſerved for Dr. *Ferriar's* 'Eſſay on an Affection of the Lymphatic Veſſels hitherto miſunderſtood,' publiſhed in the year 1798, in the third volume of his *Medical Hiſtories and Reflections.** The theory propoſed by Dr. *F.* is, that there is a general inflammatory ſtate of the abſorbents of the limb, by which they are rendered incapable of performing their functions: this was to be cured by the repeated application of leeches, a ſucceſſion of bliſters, and the uſe of gentle cathartics. This view of the diſeaſe and its treatment certainly coincides in every eſſential point with that Mr. *Trye* had before exhibited, but which Dr. *Ferriar* ſeemed to conſider as his own diſcovery. This point Dr. *Hull* has animadverted on with no ſmall ſeverity. 'Every reader,' he obſerves, 'who has accompanied me thus far, will have reaſon to ſmile at the *originality* of what this writer has *propoſed*, concerning the theory and cure of the diſeaſe under conſideration. He will perceive that it is not neceſſary to open a mine, or ſcrutinize the muſty pages of old and neglected authors, to make a diſcovery of the ſources from whence the Doctor has *borrowed* his theory and cure. He will ſee, that nothing more is requiſite for this purpoſe than to turn over a few pages in an Eſſay, publiſhed by Mr. Trye only ſix years before the Doctor's account of *An Affection of the Lymphatic Veſſels hitherto miſunderſtood*, made its appearance. For I apprehend it will not be an eaſy taſk for the Doctor to convince any perſon, that neither he, nor his friend and coadjutor Mr. Simmons, had ſeen Mr. Trye's work, or learnt this author's ſentiments from the reviews, or the converſation of ſome of their medical friends.

'Though I cannot admit Dr. Ferriar's ignorance of Mr. Trye's recently publiſhed opinions concerning the theory and cure of this diſeaſe, I can eaſily con

* For an account of this, ſee Med. and Chir. Rev, vol. 5, p. 164.

ceive him to be unacquainted with the foreign works enumerated in the ſecond ſection of this chapter; and, however this may be, the Doctor's conduct is by no means commendable. If he had read them, he ought not to have intimated, that his view of the diſeaſe, if correct, would "ſerve to direct our practice in circumſtances *where little has been attempted*"—Page 96. For he then would have known, that the practice recommended by Puzos, Levret, Sauvages, Lieutaud, &c., is of a much more active kind than that *propoſed* by himſelf; and, as it has been already ſhewn, Mr. Trye's method of cure is exactly the ſame. If he had not read them, he ought neither to have declared, that this diſeaſe is *An Affection of the Lymphatic Veſſels hitherto miſunderſtood, nor that little had been attempted in the cure of it:* becauſe he muſt be conſcious, that he was aſſerting more than he was juſtified in doing. And it was peculiarly incumbent upon him, after the declaration made in his preface, and quoted above, to make himſelf maſter of almoſt every thing that had been written on the ſubject, leſt what he had written for men, engaged in practice, ſhould be cenſured by ſtudents.'

Rejecting theſe different theories, as inadequate to the explanation of the various phenomena of the diſeaſe, the author proceeds, in the ſecond chapter, to offer one which he conceives more conſonant to its real nature, but previouſly gives a general hiſtory of the ſymptoms, with the prediſpoſing and exciting cauſes, illuſtrated by a variety of caſes which have come under his obſervation. The attack and ordinary courſe of the diſeaſe are thus accurately deſcribed. 'The complaint generally takes place on one ſide only at firſt, and the part where it commences is various: but it moſt commonly begins in the lumbar, hypogaſtric, or inguinal region on one ſide, or in the hip, or top of the thigh, and correſponding *labium pudendi*. In this caſe the patient firſt perceives a ſenſe

ſenſe of pain, weight, and ſtiffneſs in ſome of the above-mentioned parts, which are increaſed by every attempt to move the pelvis, or lower limb. If the part be carefully examined, it generally is found rather fuller, or hotter than natural, and tender to the touch, but not diſcoloured. The pain increaſes, always becomes very ſevere, and in ſome caſes is of the moſt excruciating kind: it extends along the thigh, and when it has ſubſiſted for ſome time, longer or ſhorter, in different patients, the top of the *labium pudendi* becomes greatly ſwelled, and the pain is then ſometimes greatly alleviated, but accompanied with a greater ſenſe of diſtention. The pain next extends down to the knee, and is generally the moſt ſevere on the inſide and back of the thigh, in the direction of the internal, cutaneous, and the crural nerves; when it has continued for ſome time, the whole of the thigh becomes ſwelled, and the pain is ſomewhat relieved; the pain then extends down the leg to the foot, and is commonly the moſt ſevere in the direction of the poſterior tibial nerve; after ſome time, the parts laſt attacked begin to ſwell, and the pain abates in violence, but is ſtill very conſiderable, eſpecially on any attempt to move the limb. The extremity, being now ſwelled throughout its whole extent, appears perfectly, or nearly uniform, and is not perceptibly leſſened by an horizontal poſition, like an oedematoſe limb. It is of the natural colour, or even whiter; is hotter than natural, exceſſively tenſe, and exquiſitely tender when touched; when preſſed by the finger in different parts, it is found to be elaſtic, little, if any, impreſſion remaining, and that only for a ſhort time. If a puncture, or inciſion be made into the limb, in ſome inſtances no fluid is diſcharged; in others, a ſmall quantity only iſſues out, which coagulates ſoon after; and in others, a large quantity of fluid eſcapes, which does not coagulate, but the whole of the effuſed matter cannot be drawn off in this way. The ſwelling of the limb varies both in degree and

in the ſpace of time requiſite for its full formation. In moſt inſtances it arrives at double the natural ſize, and in ſome caſes at a much greater. In lax habits, and in patients whoſe legs have been very much affected with anaſarca during pregnancy, the ſwelling takes place more rapidly than in thoſe who are differently circumſtanced; it ſometimes arrives, in the former claſs of patients, at its greateſt extent in 24 hours, or leſs, from the firſt attack.

'After ſome days, generally from two to eight, the febrile ſymptoms diminiſh, and the ſwelling, heat, tenſion, weight, and tenderneſs of the lower extremity begin to abate, firſt about the upper part of the thigh, or about the knee, and afterwards in the leg and foot. Some inequalities are found in the limb, which at firſt feel like indurated glands; but upon being more nicely examined, their edges are not ſo well defined as thoſe of conglobate glands, and they appear to be occaſioned by the effuſed matter being of different degrees of conſiſtence in different points. The conglobate glands of the thigh and leg are ſometimes felt diſtinctly, and are tender to the touch, but are ſeldom materially enlarged. And as the ſwelling ſubſides, it has happened, that an enlargement of the lymphatic veſſels in ſome part of the limb has been felt, or been ſuppoſed to be felt.

'The febrile ſymptoms having gradually diſappeared, the pain and tenderneſs of the limb being much relieved, and the ſwelling and tenſion being conſiderably diminiſhed, the patient is debilitated, and much reduced, and the limb feels ſtiff, heavy, benumbed, and weak. In this ſtate the limb continues for a longer or ſhorter time, and is commonly at length reduced wholly, or nearly, to the natural ſize.'

Sometimes it happens, that, after the diſeaſe abates in one limb, the other is attacked in a ſimilar way. Sometimes, too, it terminates in ſuppuration, and even in gangrene; and in ſome inſtances the patient is deſtroyed by the previous violence of the diſeaſe.

The

The *prediſpoſing cauſes* are ſuppoſed to be, 1ſt. The increaſing irritability and diſpoſition to inflammation, which prevail during pregnancy, and in a ſtill higher degree for ſome time after parturition. 2dly. The over-diſtended or relaxed ſtate of the blood-veſſels of the inferior part of the trunk and of the lower extremities, produced during the latter months of utero-geſtation. The *exciting cauſes* aſſigned are, contuſions, or violent exertions of the muſcles about the pelvis and thighs; the application of cold and moiſture; plethora, occaſioned by ſuppreſſion or diminution of the lochia, or of the ſecretion of milk, and by food too freely taken; and, laſtly, by ſtanding or walking too much or too early.—The *proximate cauſe* the author ſuppoſes to conſiſt in an inflammatory affection, producing ſuddenly a conſiderable effuſion of ſerum and coagulating lymph from the exhalents into the cellular membrane of the limb.

According to this view of the diſeaſe, which ſeems to account ſatisfactorily for its ſymptoms and progreſs, the treatment adviſed is ſuch as is employed generally in caſes of inflammation; viz. blood-letting and other evacuations in the early periods of the complaint, and the other means fitted to its various ſtages, which need not here be particularized.

In the third *chapter* the author points out the connexion and analogy which he ſuppoſes to exiſt between *phlegmatia dolens* and the puerperal fever, and ſome other caſes. The laſt *chapter* reſpects the *noſological* character of the genus *phlegmatia*, with its ſynonims and ſpecies.

Art. LVIII. *A Treatiſe on Febrile Diſeaſes, including Intermitting, Remitting, and Continued Fevers; Eruptive Fevers; Inflammations; Hæmorrhages; and the Profluvia: in which an Attempt is*

is made to preſent, at one View, whatever, in the preſent State of Medicine, it is requiſite for the Phyſician to know reſpecting the Symptoms, Cauſes, and Cure of thoſe Diſeaſes. By A. PHILIPS WILSON, *M.D. &c.* Vol. ſecond. 568 pages. Price 10s. Wincheſter, 1800. CADELL and DAVIES, London.

THE former volume of this ingenious and uſeful work was fully noticed in our laſt volume (p. 372): and though the author ſeemed to lean more towards modern theory than appeared to us to be juſt, we were not inſenſible to the general merits of his undertaking, nor doubted its utility in a practical point of view. In the preface to the preſent volume, Dr. *Wilſon* replies with excellent temper to the various critiques which his work has given riſe to. The contradictory tenor of theſe indeed could not fail to afford him amuſement, and it ſets the value of medical criticiſm, as uſually executed, in its true light. 'It has been ſtated by one,' he remarks, 'that I eſpouſe the general principles of the Brunonian ſyſtem; by another, that I admit no part of it but that which was admitted by all phyſicians, before Dr. *Brown*'s Elements of Medicine appeared. By one, many of my objections to this ſyſtem are regarded as invalid; by another, their validity is admitted, and I am cenſured for allowing it any merit at all. I am ſaid by one to aim at extending the Brunonian ſyſtem; by another, accuſed of attempting to bring about a coalition between the ſyſtems of Dr. *Cullen* and Dr. *Brown*, which the critic more juſtly than elegantly obſerves, is as hopeleſs a taſk as endeavouring to milk he-goats. What ſhall I ſay to ſuch extraordinary objections? I ſhall only obſerve of the two laſt, that I am perfectly unconſcious of having made either the one attempt or the other. All I have attempted is, to give an accurate view of the Brunonian ſyſtem, to ſeparate the true from the falſe parts of it, and to arrange

arrange certain facts relating to the laws of excitability without reference to any ſyſtem whatever.'

In the diſtribution of the parts of his work the author has deviated ſomewhat from his original plan; the preſent volume including all the ſpecies of eruptive fevers, or thoſe called idiopathic. The ſymptomatic fevers will form the ſubject of the ſucceeding volumes. The varieties of ſynochus now treated of are, 1. S. *Petechialis*. 2. S. *Miliaris*. 3. S. *Aphthoſus*. 4. S. *Eryſipelatoſus*; and, 5. S. *Veſiculoſus*. Theſe are followed by the *Exanthemata*, as ſmall-pox, chicken-pox, meaſles, ſcarlet-fever, plague, and nettle-raſh. On each of theſe ſubjects a variety of excellent obſervations will be found, and likewiſe a judicious eſtimate of the opinions of the beſt writers.

We tranſcribe the following remarks on Inoculation for the Meaſles, as a ſubject hitherto not mentioned in our work. 'The great ſucceſs which attended inoculation for the ſmall-pox,' Dr. Wilſon obſerves, 'induced many to believe that ſimilar advantage might be expected from it in the meaſles. The very prevalent opinion of its being received in the natural way by the lungs, and the lungs being the chief ſeat of danger in this diſeaſe, ſeemed rather to ſtrengthen the opinion. Dr. *Home*, of *Edinburgh*, however, was the firſt who actually made the experiment.

'He met with ſome difficulty from the meaſles not forming matter, and his not being able to collect a ſufficient quantity of broken cuticle, at the time of deſquamation, to produce the diſeaſe. "I then applied," he obſerves, "directly to the magazine of all epidemic diſeaſes, the blood." He choſe the blood when the eruption began to decline in patients who had a conſiderable degree of fever. He alſo ordered it to be taken from the moſt ſuperficial cutaneous veins where the eruption was thickeſt.

'While

‘ While the blood came slowly from a slight incision, it was received upon cotton, and on an incision being made on each arm of the person to be inoculated, the cotton, as soon as possible after it had received the blood, was applied over these incisions, and kept upon them, with a considerable degree of pressure. He also used the precaution of allowing the incisions of those to be inoculated, to bleed for some time before the cotton was applied, that the fresh blood might not wash away, or too much dilute the morbillous matter. The cotton was permitted to remain on the part for three days. How far all these precautions are necessary to the success of the operation has not been determined.

‘ Dr. *Home* inoculated ten or twelve patients in this way, in whom the operation succeeded equal to his hopes. The eruptive fever generally commenced six days after inoculation, and the symptoms of the complaint were milder than they generally are in the casual measles. The fever was less severe, the cough either milder or wholly absent, the inflammation of the eyes was trifling; they watered, however, as much, and the sneezing was as frequent, as in the casual measles; nor did bad consequences follow any case of inoculated measles: no affection of the breast remaining after it. The chief difference between the casual and inoculated measles seemed to be, the absence of any pulmonic affection at all periods of the latter.

‘ Dr. *Home* now regarded it as ascertained, that the natural measles are received by the lungs, and that on this circumstance depends the danger of the disease. He wished, however, to ascertain the symptoms of the complaint when evidently received by the lungs. He therefore put a piece of cotton, which had remained in the nose of a patient under measles, into that of a healthy child, making him breathe through the infected cotton. The experiment, although repeated, did not succeed in inducing the

disease

difeafe. Nor, it is evident, if fuccefsful, would this experiment have decided the queftion whether or not the caufual meafles are received by the lungs. Dr. *Home*'s experiments have not met with the attention they deferve. In fcrofulous habits, particularly, it would certainly be worth while to try his mode of inoculation. If a more extenfive experience prove it capable of producing the effects afcribed to it, it will certainly be an improvement of confiderable importance.'

ART. LIX. *A Candid Inquiry into the Education, Qualifications, and Offices of a Surgeon-Apothecary; the feveral Branches of the Profeffion being diftinctly treated on, and fuitable methodical Forms annexed; befides various other Topics connected with the principal Office are alfo fubjoined. By Mr.* JAMES LUCAS, *late a Surgeon of the Leeds Infirmary, from its Inftitution; &c.* Twelves, 356 pages. Price 5s. Bath, 1800. CADELL and DAVIES, London.

THE long experience of the author in the mixed branches of the profeffion, and the high character he has univerfally fuftained in the practice of furgery, eminently qualify him for the tafk he has here undertaken, and which he has fulfilled with no lefs honour to himfelf, than with utility to thofe for whom it was defigned. There is hardly a fubject in any way connected with the education and ftudies of a young man, entering on the profeffion of medicine, that is not here handled. The author has well beftowed his hours of retirement from public life, in offering fuch guidances and hints to the traveller that fucceeds him, as his own experience, or that of others, has fuggefted. His chief defign is, to induce the younger part of the profeffion, to fee the neceffity of having

having a regular education; and to invite them to order and method in the proſecution of their numerous and neceſſary acquirements. A plan for the arrangement and conſtruction of a pharmaceutic repoſitory is given, well worthy the attention and adoption of apothecaries.

In a work of this kind there is nothing that admits of abridgment; we content ourſelves, therefore, with recommending it earneſtly to the favour of our readers. May the author long enjoy in his retirement *otium cum dignitate!*

ART. LX. *Selectus Inſtrumentorum Chirurgicorum in uſum Diſcentium et Practicorum, Tabulis exaratus. Cum uſus declaratione. Edidit* THOMAS KNAUR. *Chir. et Art. Obſtet. Doctor, et Prof. Pub. Ord. in Cæs-Reg. Univerſit.* Leopoli Galiciæ. *Cum indice Tabularum et Inſtrumentorum trilingui, Latino, Germanico, Gallico.* Folio, 48 pages, with 25 plates. Vienna, 1796. Imported by THOMAS BOOSEY, London, 1800. Price 1l. 1s.

A WELL-ENGRAVED repreſentation of all the various inſtruments pertaining to ſurgery and midwifery is here given, together with a conciſe deſcription of their uſe, and the names of the inventors. The denominations of the different inſtruments are given in the Latin, French, and German languages. —The utility of a work of this kind need not be inſiſted on. In the words of a celebrated profeſſor of the art—" Non ergo deſpicias ullum inſtrumentum; quum ſint omnia apud te præparata: inexcuſabilis eſt enim, qui hanc artem profitetur, & non habet in promptu, quæ ad hanc artem requiruntur."—*Albucaſis,* lib. 2, cap. 67.

ART.

ART. LXI. *A Treatise on the Bath Waters. By* GEORGE SMITH GIBBES, *M.D. F.R.S. one of the Physicians to the Bath Hospital.* Twelves, 71 pages. Price 3s. London, 1800. ROBINSONS.

THE principal facts of the present Treatise have already been before the public, through the medium of Mr. Nicholson's *Journal of Philosophy.* It contains an accurate analysis of these celebrated waters; but the account we have lately given of this subject, in our analysis of Dr. Saunders's *Treatise on Mineral Waters,* renders it unnecessary to enlarge in this place.

The author intends shortly to publish a second part, which will contain an account of the medicinal properties of the Bath waters.

ART. LXII. *The Plague not Contagious; or, a Dissertation on the Source of Epidemic and Pestilential Diseases; in which is attempted to prove, by a numerous Induction of Facts, that they never arise from Contagion, but are always produced by certain States, or certain Vicissitudes, of the Atmosphere, &c.* Second Edition, with Additions. *By* CHARLES MACLEAN, *M.D. &c.* Octavo, 49 pages. Price 2s. London, 1800. MURRAY and HIGHLEY.

THE singular and paradoxical opinions of this writer were noticed by us at the time of their first appearance;* and, as we see no reason to retract the opinion we then advanced, we shall be brief in our account of the present edition. The author complains, and, we have no doubt, with reason, that his arguments against the existence of contagion have not

* *Vide* Med. and Chir. Rev. vol. 6, p. 251.

yet

yet produced general conviction.—' By the multitude, as well as by governments, and even by phyſicians,' he obſerves, ' epidemic and peſtilential diſeaſes continue ſtill to be regarded as contagious; and ſhips, arriving from New York, from Philadelphia, and from Egypt, are obliged to perform quarantine, as formerly, in England, in France, and in other enlightened nations.'—We truſt they will long continue ſo to do.

The mode of treatment which the author adviſes for the cure of the plague, and, in general, all epidemic and peſtilential diſeaſes, and which he promiſes will be found ſucceſsful, is founded on the principles laid down in his former work, and which we have already noticed.—' Whether,' he obſerves, ' in treating the plague, mercury, or other ſtimulant powers, be uſed, ſucceſs, I take upon me with confidence to predict, will depend upon the application of them, in a very high degree, and a cautious and gradual *ſubduction* of them, in the manner, and upon the principles explained, in the publications above-mentioned.

' There are two obſervations more, to which, before we part, I would earneſtly ſolicit the attention of the philoſophic reader, for whom alone I write. The firſt is, that, in the application of exciting powers to living bodies, no danger can ariſe from their degree of intenſity, whilſt it is ſuch as not immediately to deſtroy organization; the whole danger ariſing from their undue ſubduction. If, therefore, any of what I have termed the extraordinary ſtimulant powers could be applied to living bodies, with as much conſtancy, and equality of force, as the extraordinary ones of the air, oxygene, caloric, &c., no danger would ariſe from their uniform action, while it remained within the above-mentioned boundary.—The ſecond remark, as it will account for a very great number of medical miſtakes, ought, in my opinion, upon every proper occaſion, to be repeated; namely—that when the effects of the powers, directed to be applied in any given

given caſe, do not correſpond with the uſual and ordinary reſults, in ſimilar caſes, the veracity of the patient, the judgment of the phyſician, or the quality of the medicines preſcribed, are *always* to be ſuſpected; for the laws of Nature never err.

ART. LXIII. *Actes de la Societé de Medecine, &c.* : i.e. *Acts of the Society of Medicine, Surgery, and Pharmacy, eſtabliſhed at Bruſſels, with the Device Ægrotantibus.* Vol. I. Part II.; with Plates. Price 3 francs. Bruſſels, 1800.

THE firſt part of this collection was publiſhed more than twelve months ago, and is held in conſiderable eſteem by practitioners on the continent. The following Table of Contents, which is all that we can at preſent furniſh our readers with, will ſerve to ſhew that the ſecond part is not deficient in intereſting ſubjects.

1. Obſervations and Reflections on various Caſes of Cataract: by *J. Forlenze.*

2. New Obſervations on the Virtues of the Water of *Lauro-ceraſus.*

3. Obſervations on a peculiar Cauſe of Convulſions, happening to Women during Pregnancy, or at the Time of Labour: by *Guillaume Demanet.*

4. Report made to the Society, on occaſion of the preceding Memoir: by *Fournier.*

5. Letter of Cit. *Noel* to the Society.

6. Obſervation of a Laceration of the *Recto-vaginal* Partition: by *the ſame.*

7. Extract of a Report made to the Society by Profeſſor *Kok* and Cit. *Curtet*, on occaſion of the preceding Memoir.

8. Medico-clinical Obſervations, made at the Military Hoſpital of Bruſſels: by Cit. *Duval.*

 9. Medico-

9. Medico-chirurgical Obſervation, on a Caſe of inveterate Venereal Affection, complicated with caries of ſeveral of the bones of the head, and with hectic fever, cured by the uſe of the *Rob-antiſiphyllitic* of *Laffecteur*: by *Fournier.*

10. Obſervations and Reflections on the Symptomatic Depoſitions *(depots conſecutifs)* which take place in the Liver; particularly in conſequence of Wounds: by Cit. *Curtet.*

11. On the Preparation of Æther by the Muriatic Acid, or Marine Æther of the Shops: by *J. B. Van Mons.*

12. Reflections on the Influence which the Air of Bruſſels is capable of exerting on the Health of the Inhabitants of that City: by *Ph. Pollart.*

13. Memoir on the *Rhus Radicans*: by *J. B. Van Mons.*

14. Reflections on the Cachexy cauſed by the Abuſe of Spirituous Liquors, and on the Treatment applicable to this Malady: by *F. Van Stichel.*

15. Obſervation on a conſiderable Maſs of Hair appearing to belong to a Fœtus, extracted from the Abdomen of a Woman: by *J. F. Van Baregen.*

16. Obſervation of a Paralyſis of the lower Extremities, with Curvature of the Dorſal Vertebræ: by *P. E. Kok.*

17. Obſervation of a Placenta contained in a Cyſt, adhering to the Womb; with ſeveral uncommon Circumſtances which occurred during Labour: by *Fournier.*

18. Reflections on the Uſe of Opium during the Pains of Labour: by *P. E. Kok.*

MISCEL-

MISCELLANEOUS.

A CONSIDERABLE time back, M. *Vauquelin* diſcovered the preſence of *malate of lime* in the houſeleek (*ſempervivum tectorum**); and he has ſince found it to be contained in various other plants, particularly in the genus *ſedum;* in ſeveral ſpecies of *craſſula* and *meſembrienthemum;* and in all the cotyledons which he had examined. The means of detecting the preſence of this ſalt are pointed out in moſt general treatiſes on chemiſtry. It will ſuffice to obſerve here, that the juice of the plants which contain it is always more or leſs acid, and, in conſequence, reddens the tincture of *turnſol.* Thus, M. *Vauquelin* obſerves, we ſee the *malic acid* much more widely diſſeminated than has been hitherto ſuppoſed, for it had only been found in the free ſtate in the juice of certain fruits: it was not known to exiſt in a ſtate of combination in all the different parts of certain genera of plants, where it probably anſwers important purpoſes in the changes it undergoes at the different epochs of the life of vegetables. It is, perhaps, this which, becoming gradually more and more oxygenated, gives birth, in certain ſpecies of plants, to the oxalic acid; to the acidulated oxalate of potaſh; to the oxalate of lime, which *Scheele* found in many roots, and eſpecially in that of rhubarb: this is not difficult to conceive, when we conſider with what facility this acid converts itſelf into the oxalic acid.

Annal. de Chym. No. 104.

The diſtinguiſhed chemiſt above named, in conjunction with M. *Fourcroy*, preſented a memoir to the *National Inſtitute* on the identity of the *pyromucous*,

* Annal. de Chymie, tome xxiv.

pyrotar-

pyrotartarous, and *pyroligneous* acids; and on the neceſſity of no longer conſidering them as diſtinct acids.

When *Bergman* and *Scheele* had diſcovered the exiſtence of various vegetable and animal acids, and had deſtroyed the ſuppoſed identity of theſe bodies, the chemiſts buſied themſelves in ſubmitting the divers vegetable acid ſubſtances to a new examination. In a ſhort time, the number of theſe compounds, which were before reduced to two ſpecies, was increaſed much beyond thoſe which were derived from the mineral kingdom, limits being no longer aſſigned to the multiplicity of theſe natural productions of organized bodies. The acid liquors extracted by diſtillation from mucous ſubſtances, wood, and tartar, although the reſult of artificial decompoſition, were comprized in the claſs of vegetable acids; whilſt certain analogies, founded in their common origin, their brown colour, and their burnt flavour, ſerved to refer them to a particular genus, under the denomination of empyreumatic acids. The accurate examination of theſe by MM. *Fourcroy* and *Vauquelin*, here detailed, prove ſatisfactorily that their nature has not been hitherto ſufficiently inveſtigated, and that it was for want of a cautious and rigorous analyſis that they have been concluded to be different from each other, and from another vegetable acid,—the acetous.

By treating the empyreumatic acids above-mentioned by filtration, agitation, ebullition with charcoal, union with lime and the alkalies, and, laſtly, by the dilute ſulphuric acid, they obtained the acetous acid in a ſtate of purity; thus proving, that the peculiar characters of the burnt acids were owing entirely to the ſolution of an empyreumatic oil in the acetous acid. This was ſtill further manifeſted by ſyntheſis; for by diſtilling vinegar from the empyreumatic oils, procured from mucilage, tartar, and wood, a coloured liquid came over, of preciſely the ſame nature with the primitive pyromucous, pyrotartarous, and pyroligneous

ligneous acids. The ſame effect was produced by ſimply agitating the acetous acid and empyreumatic oils together for a ſhort time. It is to this ſolubility of the oils in the acetous acid that the odour this acid ſo readily contracts and retains is probably to be attributed. A new ſource of the production of the acetous acid is thus pointed out; its origin no longer being attributable, as formerly, to the vinous fermentation alone: its production appears to be one of the moſt conſtant phenomena of vegetable and animal analyſis.

Ibid.

M. *Raymond*, Profeſſor of Chemiſtry in one of the provincial ſchools of France, has diſcovered lately ſome properties of the *phoſphorated hydrogen gas*, which were before unknown to chemiſts. The ſingular property this air poſſeſſes of taking fire ſolely by contact with the atmoſphere; the undulating and continually-increaſing ring, which follows its exploſion, when it is ſuffered to eſcape through water in ſucceſſive bubbles; the brilliancy which attends its combuſtion in pure oxygen gas; and the ſudden and total converſion of theſe two gaſes into water and phoſphoric acid; were circumſtances before ſufficiently known. In addition to theſe M. *Raymond* diſcovered, that the phoſphorated hydrogen gas is miſcible with water, nearly in the proportion of a quarter its volume, at the temperature of 10° of Reaumur. It communicates to the water in which it is diſſolved, a ſtrong and unpleaſant odour, and a bitter taſte. When water is uſed for the purpoſe which has been deprived of its air by boiling, and the ſolution is cautiouſly kept in well-cloſed veſſels, it may be preſerved unchanged for a conſiderable length of time, giving out, on the application of heat, the whole of the gas which it originally imbibed; the diſtilled water recovering, at the ſame time, its primitive properties. Laſtly, this ſolution is capable of readily reducing many metallic oxides, either alone or diſſolved in acids,

acids, and of forming with them, by double elective attraction, water and metallic sulphures; combinations which have hitherto been made only in the dry way. It remains to be proved, whether water thus impregnated with the phosphorated hydrogen gas, is capable of being usefully employed in the practice of medicine; as its ready decomposition, and the important part which phosphorus acts in the animal oeconomy, might lead one to suppose.

We have already had occasion to remark, that the supposed cure of *lues venerea* by acids is less novel than is generally imagined. M. *Girtanner*, since deceased, in a letter to M. *Van Mons*, dated Gottingen, 26 January, 1800, puts in his claim to the discovery.—" Since I made the discovery," he observes, " that oxygen cures venereal affections, that is, for twelve years past, I have made, on the subject, a vast number of experiments, of which the following is the result. When the disease is not inveterate, and when the first degree of oxidation only is required, I make use of the citric acid; for the second degree, I employ the oxalic acid diluted; for the third, and, in general, in the most inveterate cases, I use the solution of the oxide of arsenic, than which last I know nothing more efficacious in venereal affections, diseases of the liver, obstructions in the lower belly, dropsy, &c.: but it is necessary, in these cases, that there be no affection of the lungs; otherwise the patient is liable to be quickly destroyed. I mix four or five drops of a saturated solution of white arsenic (in the nitric acid) with two pints of water, and I order this quantity to be taken in two days. I perform wonders with this remedy. There is nothing more effectual in intermittent fevers. If the patient begins to cough, the remedy must be discontinued; because the dry cough is a sign that the body begins to be super-oxygenated. Should the cough continue, it may be soon made to disap-

diſappear, by the uſe of *liver of ſulphur.* I ſpeak from experience more than a hundred times repeated." Annale de Chym. No. 102.

An important fact reſpecting Cow-pox has lately been noticed by Dr. *Jenner*, which is, that its preventive power, with regard to other diſeaſes, is not confined to the human conſtitution, but takes place alſo in other animals. The diſeaſe commonly termed the *Diſtemper* in Dogs, is well known to be attended with great mortality, and no remedy, at all to be relied on, has hitherto been employed for its cure. By inoculation with vaccine matter, the dog is affected with mild febrile ſymptoms, which terminate ſpontaneouſly in two or three days. It has been found, that the animal afterwards is not ſuſceptible of being affected with the *Diſtemper.* Many trials of this ſort are ſaid to have been made, and with uniform ſucceſs.

The vaccine inoculation continues to be practiſed with all the ſucceſs that has hitherto been attributed to it. In many of the moſt conſiderable provincial towns it has been very extenſively employed; and a conſiderable part of the army and navy, both at home and in the Mediterranean, have undergone the operation. Rumours, however, of variolous infection, ſubſequent to the vaccine, continue to be propagated; but they want that minute and circumſtantial evidence which can alone produce conviction, and which has been amply produced on the other ſide. The general ſafety and mildneſs of the vaccine diſeaſe, alſo, continue to prevail. An inſtance of the reverſe, however, is ſaid to have lately occurred, which, till ſatisfactorily explained, may, perhaps, tend to the prejudice of the new practice. The poor of a village in the neighbourhood of London underwent a general inoculation for the cow-pox, and for this purpoſe were conſigned, in different proportions, to the care of the reſident practitioners, who were four in number. The

 patients

patients of three of them went through the diſeaſe in the uſual mild way, without one unfavourable ſymptom. Thoſe of the other gentleman, amounting to fifteen in number, did not fare ſo well. Six of them took the infection, and went regularly through the diſeaſe. In the other nine, infection did not take place: theſe, therefore, were again inoculated, nine days afterwards. The ſymptoms produced by this inoculation were, extenſive eryſipelas, ſpreading rapidly from the part inoculated, accompanied, in many inſtances, by conſiderable conſtitutional affection; followed, in moſt, by an immediate ulcerative proceſs, and, in ſome, even a tendency to gangrene. An inquiry into the facts was purpoſely inſtituted by ſome of the medical officers connected with the *Vaccine Inſtitution*, and from their report, as publiſhed in the *Medical and Phyſical Journal* for December, it appears, that the practitioner in queſtion acknowledged that the matter with which he had charged the lancet for this purpoſe, had been taken at a very late period of the diſeaſe, after a brown ſcab had formed, and had a purulent appearance at the time it was taken from the arm. It is proper further to obſerve, that the matter thus taken was not alone truſted to, but fluid vaccine matter was alſo taken on the ſame lancet from the arms of different children before inoculated. If this is a correct ſtatement of the caſe, it is plain that no argument is afforded by it againſt the vaccine practice. It is extremely probable that the affection thus produced was owing to the poiſonous ſtate of the matter employed, altogether different to the vaccine in the veſicular ſtage of the puſtule, perhaps without its prophylactic powers. It is in confirmation of this, that, in two of the patients who were ſuppoſed to have gone through the cow-pox diſtinctly, by the former inoculation, the ſame ſymptoms were induced in attempting to procure cow-pox fluid from them with the ſame lancet.

Thus

Thus it appears, that a minute attention to circumſtances is neceſſary to avoid bringing undue diſcredit on the vaccine practice: nor is the character of the practitioner leſs concerned. From the different facts which have been publiſhed on the ſubject, it ſeems requiſite to attend particularly to the following points. 1. That the fluid be taken from the vaccine puſtule not later than the ninth day of the diſeaſe; 2. that it be perfectly limpid, as it is not to be depended on when it has become opaque. 3. The fluid, if not uſed immediately, ſhould be allowed to dry gradually and thoroughly, before it is laid by for uſe. The punctures, alſo, ſhould be ſingle, and as ſuperficial as poſſible, and early attention ſhould be paid to repreſs any exceſs of inflammation which may ariſe. This, it is proper to remark, is beſt done by cold and reſtringent applications, and not by emollient fomentations or poultices, which are found to be prejudicial.

A means of aſcertaining when the vaccine inoculation is effectual has been propoſed, which is alſo applicable to ſmall-pox (for the appearance of a puſtule is not entirely to be relied on). This is, as ſoon as matter is formed in the arm firſt inoculated, the other arm is to be inoculated with ſome of this matter: the inflammation thus produced ſoon overtakes the former, and the puſtules in each advance equally to maturation and ſcabbing; ſhewing that the conſtitution is under the full influence of the diſeaſe. If it be true, as Dr. *Jenner* ſuggeſts, that the cow is liable to two ſpecies of eruption on the udder, one of which only is endued with preventive powers, although they both are capable of exciting local inflammation when applied to the human body, much confuſion is likely to ariſe, unleſs particular care is taken to aſcertain the genuineneſs of the matter employed. To effect this with certainty, it would ſeem proper to adopt the *Suttonian* practice with regard to ſmall-pox; that is, to uſe only the ſecondary virus as produced in the human ſpecies; recurring to the original

ginal diſeaſe in the brute as rarely as poſſible, and not till its preventive power has been proved by ſubſequent experiment with the variolous matter.

The *Digitalis Lutea* is ſaid, by Dr. *Careno* of Vienna, in a Treatiſe on the Efficacy of this Plant in Dropſy, to poſſeſs ſtronger diuretic powers than the *digitalis purpurea*; and that without producing any of the uſual noxious effects of the latter. He obſerves that he has ſucceeded in curing many dropſies with the *digitalis lutea*, after the other ſpecies had failed.

Memoirs of the Royal Academy of Berlin, for 1794-5.

M. *Lowitz*, a celebrated chemiſt and apothecary of St. *Peterſburgh*, in *Crell*'s Chemical Annals for 1799, points out the following advantageous method of ſeparating the acid of Tartar from crude Tartar. Fifteen pounds of crude tartar are to be mixed with four pounds of chalk, in a well-tinned copper veſſel, and two hundred pounds of cold water gradually added. When the efferveſcence has ceaſed, the mixture is to be heated, and when at the point of boiling, ſmall quantities of tartar and chalk are to be added by turns till no more efferveſcence takes place, and the point of ſaturation is attained, when the liquid is to be filtered, and precipitated by muriate of lime. The clear liquid is then to be decanted off, and the precipitates waſhed till they become perfectly colourleſs and inſipid. The tartrite of lime thus formed is to be decompoſed by three pounds of ſulphuric acid diluted in an equal quantity of water, and the whole mixed with 50 or 60 pounds more of water: it is neceſſary that this acid liquor contain a ſmall exceſs of ſulphuric acid, in order to favour the cryſtallization of the acid of tartar. The ſupernatant liquid is then decanted off from the ſulphate of lime, mixed with from 4 to 6 ounces of charcoal in powder, and evaporated by continued boiling to the point of cryſtalliza-

cryſtallization. When cold, it is ſeparated by filtration from a ſmall quantity of ſulphate of lime, which then becomes depoſited; and it is, laſtly, ſubmitted to inſenſible evaporation, for cryſtallization to take place. In order to aſcertain when the juſt proportion of ſulphuric acid has been uſed, half a drachm of the acid ſolution is to be mixed in an ounce of water, and ten or fifteen drops of liquid acetite of lead added. In dropping into this mixture nitric acid, if it become immediately tranſparent, and remains ſo for ſome hours, it is a proof that too little of the ſulphuric acid has been uſed: on the other hand, if the liquor does not at once become clear, the acid is in exceſs; but if, after firſt becoming clear, it again loſes its tranſparency in the ſpace of a few minutes, the proper point has been attained. This trial ſhould be made juſt previous to its being ſet to cryſtallize.

By this operation the tartareous acid is furniſhed in beautiful white cryſtals. In order to waſh off all adhering ſulphuric acid, a little cold water may be poured over the cryſtals.

M. *Van Mons* adviſes, with regard to the proceſs here pointed out, to dilute the ſulphuric acid with at leaſt four times its weight of water, in order to prevent the dehydrogenating action of this acid on the tartar, and, for the ſame purpoſe, to avoid carrying the evaporation too far; laſtly, not to add the exceſs of ſulphuric acid till ſuch time as the whole of the ſulphate of lime, which this acid renders ſoluble by acidulating it, is ſeparated. M. *Lowitz* obſerves, that, in obtaining the citric acid by the means here recommended, it is ſtill more neceſſary that there be a ſlight exceſs of ſulphuric acid, as the acidulated citrate of lime is much more ſoluble than the tartrite of this earth.

Ann. de Chym. No. 100.

M. *Hildebrandt,* in a Memoir on the Blood, &c., thinks, that the opinion which attributes the red colour of this fluid to the oxide of iron contained in it, ought

ought not to be rejected ſo lightly as has of late been done. He conſiders the ſoda, not as an *educt*, but as a *product* of the ſerum of the blood which compoſes it at a red heat, by the union of azote and hydrogen in a particular proportion.

In coagulating pure ſerum, ſeparated from the coagulum, in a retort, the neck of which is plunged into water, and incinerating this concrete lymph in a crucible, we obtain ſoda in abundance; whilſt the fibrous matter of the blood, waſhed and treated in the ſame manner, furniſhes none of this alkali. M. *Hildebrandt* explains this difference by the larger proportion of oxygene (and, conſequently, leſs of azote and hydrogene), which he ſuppoſes to exiſt in the fibrous ſubſtance, than in the ſerum; and he attributes the concretion of the fibrous ſubſtance of the coagulum to the preſence of the oxygene, or to the precipitation of this principle (which he regards as an element of conſolidation) on a portion of the ſerum.

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M. *Hildebrandt*, moreover, conſiders the animal fibre (the baſis of all the ſolid parts of the body) as derived from a portion of the ſerum coagulated in the extremities of the arteries by the oxygen of the blood; this fixation of the oxidating principle being the cauſe of the darker colour of the venous blood. Fatigue, exhauſtion, or the ſuſpenſion of the activity of the body, depends, in his opinion, on the loſs of a ſubtle matter, ſuch as the electric, magnetic, and Galvanic fluids, which are reproduced by repoſe. The known effects of oxygen on the animal oeconomy inclines the author to the opinion of M. *Girtanner* and others, who conſider this as the principle of irritability.

M. *Hildebrandt* endeavours to deduce the theory of animal heat from that of aſſimilation. The inſufficiency of all the hypotheſes hitherto offered on the ſubject has been clearly ſhewn, he conceives, by M. *Rooſe*. In fact, he obſerves, the chills and heat in fever; the change of temperature under a ſtate of ſuffering;

fering; the uniform heat of the different parts of the ſyſtem; the heat or cold with which diſeaſed parts are excluſively affected; the conſtant degree of temperature in warm-blooded animals, which is not raiſed by expoſure to an atmoſphhre heated much beyond this degree; all forbid us to look for the ſource of animal heat in the lungs. Particularly, he conceives, we are deceived, in ſuppoſing that, in reſpiration, caloric is ſet at liberty from the oxygen gas inſpired; the quantity thus let looſe being merely ſufficient for putting the carbonic acid which is formed into the gaſeous ſtate.—This, however, M. *Van Mons* obſerves, appears exceedingly improbable, when we reflect, that the carbonic acid gas contains ſo little caloric, that water is capable of readily condenſing it by ſimple phyſical attraction, and that it returns again to the ſtate of expanſion, at every temperature, without any ſenſible production of cold; eſpecially, too, when we conſider that the volume of oxygen gas which diſappears, greatly exceeds that of the carbonic acid produced.

M. *Hildebrandt* places the ſource of animal heat in the change of capacity which the arterial blood undergoes in being transformed into venous blood. It is known that the ſtate of oxidation augments the capacity of bodies for heat, whilſt diſ-oxidation, on the contrary, diminiſhes it.—To this cauſe the author might, perhaps, have added, the paſſage of the liquid ſerum to the ſtate of ſolid fibrous ſubſtance, and the other fixations of oxygen in the ſyſtem: but it may be doubted how far all theſe are ſufficient to account for the great quantity of heat evolved. Ibid.

The production of Sugar from the *Beet Root*, and other ſubſtances, is a ſubject that has engaged the attention of many celebrated chemiſts on the continent for ſome time paſt, and very contradictory ſtatements have been made with regard to it. It may not be unacceptable to our readers to furniſh them with the principal

principal facts which have been brought to light by the experiments of different philoſophers; and this we are enabled to do by conſulting the report preſented by the *Commiſſion* of the French *National Inſtitute,* appointed for the expreſs purpoſe of inveſtigating the ſubject.

It was long a received opinion, that the ſugar-cane was the only plant capable of furniſhing ſugar in any conſiderable quantity; and it was imagined that the cane might be capable of cultivation in temperate climates, ſo as to afford this very important article of commerce. Experiments for the purpoſe were made accordingly, on a tolerably large ſcale, in the moſt favourable part of France. But though it was found that the plant acquired a height and magnitude nearly equal to what it attains in America; when the neceſſary experiments for extracting the ſugar were made, a ſyrup only could be obtained, which was not cryſtallizable. The production of a perfect ſugar requires a concurrence of circumſtances, which would be in vain looked for in theſe climates; viz. a long-continued heat with proportionate humidity.

The caſe is much the ſame with regard to the maple (*acer ſaccharinum,* Lin.), which, in America, is capable of furniſhing a very conſiderable quantity of this article, but is not likely to be cultivated in Europe with effect.

Several other vegetables, whoſe taſte promiſed to contain ſugar, have been examined by chemiſts with this view; for inſtance, the turnip, carrot, the ſtalks of maize, and many others; but notwithſtanding the aſſertions of ſome enthuſiaſts, it was proved that none of theſe vegetables were capable of ſupplying the place of the ſugar-cane; and the attempts which were made to procure the ſugar they were ſuppoſed to contain, were all unſucceſsful. Such was the ſtate of things when M. *Achard* of *Berlin* announced that he had diſcovered the means of extracting ſugar from the

the *white beet* in ſuch quantity, as to be able to afford it at the trifling expence of nine *ſous* a pound.

M. *Margraaff* had, many years before, demonſtrated the poſſibility of extracting a true ſugar from this root; but as the quantity he thus obtained, notwithſtanding the accuracy of his experiments, did not appear to him conſiderable enough to promiſe any adequate advantage from its general adoption, he contented himſelf with preſenting the fact, as a ſimple diſcovery, which added a new product to thoſe already afforded by vegetable analyſis; and he concluded from it, that ſugar was not contained excluſively in the cane, but exiſted, likewiſe, in many other vegetables. Notwithſtanding the acknowledged reputation of M. *Achard*, doubts were entertained of the accuracy of his experiments: and in order to remove theſe, and to put the facts alledged beyond the reach of controverſy, a *Commiſſion* was nominated, conſiſting of the moſt diſtinguiſhed chemiſts in France; viz. MM. *Cels*, *Chaptal*, *Darcet*, *Fourcroy*, *Guyton*, *Parmentier*, *Teſſier*, *Vauquelin*, and *Deyeux*. The following is the ſubſtance of the report made by them, and the principal reſults they were enabled to obtain.

They firſt endeavoured to aſcertain the real quantity of ſugar which the beet root might contain. For this purpoſe, they had recourſe to the proceſs employed before by *Margraaff*; that is, by digeſting for ſome days in alkohol a determinate quantity of the dried root. The fluid being then decanted, and evaporated to the proper point, the ſugar it contained was readily obtained by cryſtallization. In this way they found the proportion of ſugar contained in the dried root amounted to one-ſixteenth of the original weight.

This fact being aſcertained, they next repeated the experiments of M. *Achard*. The proceſs employed by this chemiſt conſiſts in boiling the root in water; afterwards expreſſing the juice, and evaporating it to the conſiſtence of a ſyrup. This ſyrup being

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ſet aſide in proper veſſels, affords a granulated ſugar, in the ſtate called *muſcovado* ſugar. This proceſs, ſeveral times repeated, afforded nearly ſimilar reſults; 18 parts of ſugar being procured from 1152 parts of the root, or 1 in 64. The ſugar thus obtained was of a dark colour, and far from pleaſant to the taſte.

By repeated purifications, however, theſe qualities were got rid of, and it aſſumed the character of the common ſugar of commerce. By diſſolving a portion of the ſame in alkohol, a ſugar candy was obtained, in all reſpects reſembling that furniſhed by the ſugar-cane.

Theſe experiments demonſtrated, that if, by means of the proceſs recommended by M. *Achard*, ſugar might be obtained from the *beet*, it was nevertheleſs certain, that the quantity of this ſubſtance was decidedly leſs, than when the method by alkohol, as indicated by *Margraaff*, was had recourſe to. It could not, therefore, be doubted, that the proceſs of M. *Achard* effected the decompoſition of a part of the ſugar contained in the root; and, judging it poſſible to remedy, in ſome degree, this inconvenience, the *Commiſſion* made ſome experiments, for the purpoſe of putting it to the proof. Inſtead of employing the expreſſed juice of the boiled root, as M. *Achard* recommends, they made uſe of the raw root. The expreſſed juice of this, evaporated to the proper point, and with the neceſſary precautions, gave, after ſtanding above a month in the tub, near a quarter more of *muſcovado* ſugar than the ſyrup made with the juice of the boiled root.

In conſidering the extraction of the ſugar of the *beet root*, according to the preſent proceſſes for obtaining it, it is curious, no doubt, to aſcertain, whether it will afford a profit to the manufacturer; and whether, as M. *Achard* ſuppoſes, this root can be ſubſtituted with advantage for the ſugar-cane. To determine this queſtion, the *Commiſſion* proceeded as follows. By enquiries amongſt the different perſons accuſtomed to grow this root, they were enabled to calculate

culate the probable expence and product on a suppos-ed large scale: the result was, that pure sugar might be afforded at the rate of eighteen sous a pound. Though this price is far from exorbitant (and it might, probably, admit of diminution, by improvement in the processes for obtaining it), it is yet much above that mentioned by M. *Achard*, which does not exceed the half of the above sum. Without, however, accusing M. *Achard* of exaggeration, the *Commission* observe, that the roots growing in Germany may, perhaps, contain naturally a greater quantity of sugar than those of France; and it is possible, likewise, that careful culture may effect a similar change.

Such are the conclusions which, after repeated and cautious experiment, the *Commission* have ventured to draw relative to this subject; the further investigation of which seems to lead to consequences of no small importance, in more than one point of view.*

Ann. de Chym. No. 104.

Cit. *Penon*, a Member of the French *National Institute*, entertains some ideas relating to the subject of generation, which will probably be deemed a little singular. He conceives, that not only the watery parts of the blood, but the urine itself, contribute to the dilatation of the womb, by relaxing it; and that it is not without reason that the urinary bladder and womb are so nearly situated to each other. The membranous covering which the peritonæum furnishes to the womb, does not penetrate between it and the bladder; this latter organ, according to M. *Penon*, participating in the dilatation which the adjoining uterus undergoes, suffers a portion of the liquid it contains to pass through its pores, and thus to soften the substance of the womb. This action, he thinks, may be promoted by syringing with warm water. Having observed further, that acids give an astonishing degree

* M. *Scherer*, of Vienna, has discovered, that the *beet root*, after being subjected to pressure, is still capable of furnishing a fermented liquor, by drying and malting.

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of elaſticity to the uterus, he imagines that the milk which is diſtributed throughout the cells of this organ, after delivery, becomes, in conſequence of acidity, one of the principal cauſes of the contraction of this organ.

A new operation for reſtoring ſight, in certain caſes of blindneſs, has lately been performed with ſucceſs by M. *Demours*, a French Surgeon, and which promiſes to be of ſingular ſervice in many caſes which have been hitherto deemed incurable. A patient had an abſceſs in the cornea, in conſequence of which the aqueous humour was entirely waſted, and the tranſparent part of the cornea had become totally white and opaque in the right eye, and for about four-fifths of its diameter in the left, in which a ſmall portion only of the iris was viſible towards the upper part, the pupil being entirely hidden. M. *Demours* taking advantage of the tranſparency which ſtill remained towards the upper part of the cornea of this eye, made a ſmall aperture, and having introduced into it a delicate pair of ſciſſars, made a ſmall hole in the iris, of the ſize of a ſeed of ſorrel. Through this hole the rays of light now enter, and form images on the retina at the bottom of the eye, thus conſtituting, as it were, an artificial pupil. But as behind this new pupil there is no cryſtalline humour, to collect the rays with ſufficient accuracy on the retina, the patient is obliged, in order to read, to make uſe of a very convex glaſs, ſuch as is uſed by perſons from whom the lens has been extracted. He does not find it neceſſary, however, to employ the glaſs, except in caſes which require more diſtinct viſion; as he poſſeſſes, without it, the invaluable advantage of ſeeing well enough to direct his way, and to diſcern perfectly every object around him.

The neceſſity of uniting the practice to the theory of chemiſtry, in order to make an uſeful application of this branch of knowledge to the arts, has been ably ſhewn by M. *Thenard*, in a diſcourſe read before the

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Polytechnic School of Paris. It is perfectly demonſtrable, he obſerves, that it is impoſſible to acquire an accurate and preciſe knowledge in chemiſtry, without actually making experiments oneſelf. The neceſſity of chemical knowledge to the practitioner in medicine is ſufficiently apparent; for, without this, he can neither become acquainted with the various ſolids and fluids of the animal body, nor can he underſtand the action which different medicinal ſubſtances exert on each other reciprocally. In pharmacy, this branch of knowledge is ſtill more eſſential, as being continually called for: there exiſts, however, a fundamental error in the education of young men in this reſpect. They uſually paſs ſeveral years in learning the preparation of a great number of medicaments in a ſort of routine, and afterwards attend a courſe, or, at moſt, two, of lectures on chemiſtry; from which they, at beſt, acquire a ſuperficial knowledge of the ſcience. Inſtead of this inverted order of ſtudy, the ſtudent ſhould go into the laboratory of the chemiſt, and there employ himſelf in the various manipulations, and the preparation of different ſubſtances, and in the art of analyzing bodies. In this way a proper foundation may be laid for the ſtudy of pharmacy, which then becomes an art of eaſy and ſpeedy acquiſition. Upon this principle the plan of education adopted in the *Polytechnic* School is eſtabliſhed.

A Propoſal has been circulated by Dr. *Hull*, of Mancheſter, for publiſhing by ſubſcription an Epitome of the celebrated *Noſologia Methodica* of Sauvages.—This invaluable work, comprehending the *ſpecies* and *varieties* of Diſeaſes, with obſervations on their cauſes and cure, was firſt publiſhed in 1763. A ſecond edition, in 2 volumes 4to., was printed at Amſterdam in 1768, after the author's death, but with his own emendations, and containing, beſides, the Ætiological and Anatomical Syſtems. A new edition of this work, with ſome engravings, alterations, and additions, by *C. F. Daniel*, was publiſhed in 1790-1797,

1797, at *Leipſic*, in 5 volumes 8vo., and a tranſlation of it into the French language, by *M. Nicolas*, was printed at *Paris*, in 1770-1772, in 3 volumes 8vo.—The edition announced by Dr. *Hull* is intended to form 2 *octavo* volumes, and, of courſe, will be a material abridgment of the original work. This reduction in ſize will be effected by the omiſſion of that part of the *prolegomena* which the author terms *Philoſophical Noſology*; whilſt every thing material relative to *Hiſtorical Noſology* will be retained. The *Theory* and *Introduction*, prefixed to each of the claſſes, will likewiſe be much abridged. The *obſervations* relating to the *cauſes*, *prognoſis*, and *cure* of each ſpecies, will be, with a few exceptions, omitted.

M. *Sauvages* has not always given a character to the *ſpecies*, but has referred the reader to ſome author who has treated on it, or has himſelf given a detailed hiſtory. This deficiency Dr. *Hull* has endeavoured to ſupply, by giving ſuch ſpecific characters as appear to be expreſſive of the author's ſentiments. This, however, may be conſidered as rather an hazardous undertaking. The omiſſion of the author, probably, aroſe from his having felt the difficulty of the ſubject.

Mr. *Parkinſon*'s Chemical Pocket-book is expected to be re-publiſhed in the beginning of January, in an elegant form, and enriched by the introduction of the lateſt diſcoveries in the ſcience.

Correſpondence.

IN anſwer to *A Conſtant Reader* we have to obſerve, that, on looking at the article in queſtion, we do not perceive the contradiction to which he alludes. It ſeems to be merely ſupplementary to the preceding, and in no wiſe in oppoſition to it. If our Correſpondent will have the goodneſs to explain himſelf more fully at length on the ſubject, we ſhall be happy to attend to it.

A Correſpondent wiſhes for information on the following point. In the firſt edition of Dr. *Lind*'s Treatiſe on the Scurvy, mention is made of an intended plan for improving medical knowledge, by the inſtitution of a Society of Surgeons of the Royal Navy, and the publication of its labours.——*Qu.* Did any publication on this plan take place; or was ſuch a Society ever inſtituted?

No. XLI.

THE

MEDICAL AND CHIRURGICAL

REVIEW.

FEBRUARY, 1801.

ART. LXIV. *A Treatiſe on the Chemical Hiſtory and Medical Powers of ſome of the moſt celebrated Mineral Waters, &c. &c. By* WILLIAM SAUNDERS, *M. D.*

(Continued from page 265.)

THE next claſs of mineral waters noticed by Dr. *Saunders* is what he terms the *ſimple ſaline*, or thoſe that only differ from common water in being impregnated more or leſs ſtrongly with ſome neutral ſalt with either an alkaline or earthy baſis that renders it purgative when taken in ſuch a doſe as the ſtomach can bear without being much incommoded by the mere bulk of liquid. This claſs, the author conceives, may with eaſe and ſafety be imitated artificially, without any particular precautions or apparatus. This is not the caſe, however, with the more compound waters, eſpecially thoſe that contain much of any gaſeous body, the activity of which, as a chemical agent, is generally fully equal to that which it poſſeſſes as a medicine

medicine. The ſimple ſaline waters uſually contain ſeveral ſalts; ſome active, others apparently inert: they are moſtly cold, but ſometimes warm; and not unfrequently they are found in the neighbourhood of a chalybeate ſpring, which latter is often very purely ſo, whilſt the other is ſtrongly ſaline.

The firſt of the preſent claſs here noticed is the *Sedlitz* or *Seydſchutz* water, the ſtrongeſt of the *ſimple ſaline* tribe, and found at the village of *Sedlitz* in *Bohemia.* To the taſte, this water is very ſaline and bitter, but not in the leaſt briſk or acidulous. From analyſis, it appears that this water is ſtrongly impregnated with vitriolated magneſia, or Epſom ſalt, together with a ſmall quantity of muriat of magneſia. It cloſely reſembles in its properties, therefore, the Epſom water, and, like it, has been employed for the preparation of the purgative ſalt, known under the name of *Sedlitz ſalt.*

The *Epſom* water is now ſcarcely at all employed in medicine, nor is it uſed for the preparation of the *bitter purging ſalt,* this being prepared at preſent from ſea water, boiled down to procure from it its muriated ſoda. An uncryſtallizable brine remains, which is chiefly muriated magneſia; and by preſenting to it the ſulphuric acid, under any form of combination, the ſulphat of magneſia is readily procured.

There are many other ſimple ſaline ſprings, of the ſame general nature with the above, in the neighbourhood of London. Such are the purging ſalt ſprings of *Acton,* of *Kilburne,* of *Bagnigge Wells,* and of the *Dog and Duck* in St. George's Fields.—They contain, however, but a very ſmall portion of ſalt in their compoſition; and therefore it is a common cuſtom to quicken their operation by the addition of ſome of the ſame ſalt which gives them their purgative quality.—*Sea-water* is another of the claſs of ſimple ſaline waters, but which needs not detain us here.

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One of the moſt celebrated of the foreign mineral ſprings is that of *Seltzer*, in the biſhopric of Triers. This water is ſlightly alkaline, highly acidulated with carbonic acid, containing more of this volatile principle than is ſufficient to ſaturate the alkali, and the earths which it holds in ſolution; and hence it is ſomewhat acidulous to the taſte, and ſhews the preſence of an acid by chemical teſts, notwithſtanding the alkali, which is alſo and at the ſame time indicated by other re-agents. It is however a hard water, and curdles ſoap, the ſoda not being in ſufficient quantity to prevent this effect. This water is obſerved by Hoffman to become not only vapid, but putreſcent, and ſtrongly fetid in a very ſhort time when expoſed to the air. Perhaps this may be owing to a ſmall quantity of vegetable extractive matter. It requires, therefore, to be kept cloſely corked, and the mouth of the bottles covered with a cement, to prevent the eſcape of the carbonic acid; for as long as this antiſeptic acid remains, the water continues perfectly ſweet.

Seltzer water is the only example which we poſſeſs of a water, ſaline, alkaline, and at the ſame time highly acidulated. Moſt of the other ſtrongly carbonated waters are more or leſs chalybeate, and no other of the ſaline waters contains ſo much carbonic acid.

The effects of this water, when drank in moderate doſes, are to raiſe the ſpirits, and encreaſe the appetite: it produces no particular determination to the bowels, as its ſaline contents are in very ſmall quantities, but it pretty certainly encreaſes the flow of urine. It is chiefly to the ſtrong impregnation with carbonic acid, and to the ſmall proportion of ſoda which it contains, that we are to look for the explanation of the very important benefit which is derived from it in a variety of diſeaſes.

The Seltzer water is reckoned beneficial in hectic fever ariſing from diſeaſed lungs, and other cauſes; in ſcorbutic eruptions, as they are termed; in bilious

 and

and the like complaints of the primæ viæ; in calculous complaints; and in hypochondriac and dyſpeptic ſymptoms. The uſual doſe is from half a pint to a pint. Half a pint contains two grains of mild ſoda, about nine grains of common ſalt, and four grains of carbonated earths for its ſolid contents; and for the gaſeous, about 8½ cubic inches, or more than a quarter of a pint in bulk of pure carbonic acid.

The next claſs of waters noticed is the *Chalybeate.* A diſtinction is here made into the *ſimple* carbonated chalybeates, and the *highly* carbonated chalybeates, ſuch as the Spaw and Pyrmont waters: in theſe laſt the carbonic acid is in exceſs. The moſt noted of the ſimple chalybeates in this country is that of *Tunbridge,* in Kent. When this water has ſtood for ſome hours expoſed to the air, the ſides of the veſſel become covered with minute bubbles, the liquid grows turbid, a yellowiſh irideſcent pellicle encruſts the ſurface like a very thin ſcum, and in twenty-four hours the water has entirely loſt its chalybeate properties: the ſame effect takes place more rapidly when the water is heated. This circumſtance ſhews that all the iron is ſuſpended by the carbonic acid alone.

The whole contents of a wine gallon of Tunbridge water, according to Dr. Babington's analyſis, are the following:

		Grs.
Of oxyd of iron	——	1.
— common ſalt	——	0.5
— muriated magneſia	——	2.25
— ſelenite	——	1.25
		5.
		Cubic Inches.
Of carbonic acid gas	——	10 6
— azotic gas	——	4.
— common air	——	1.4
		16.

Total—

Total—five grains for the ſolid contents, and ſixteen cubic inches for the gaſeous.——Many intereſting remarks occur on the ſubject of the medical properties of the chalybeate waters, which we are obliged to paſs over. Springs of this deſcription are to be met with in various parts of England, as in Malvern, Hampſtead, Iſlington, &c.

Another claſs is the *ſaline carbonated chalybeates*, containing in ſolution a conſiderable quantity of ſome purgative ſalt, as vitriolated ſoda, or vitriolated magneſia, or both. In our own country theſe waters are all cold, but on the continent many of them are conſtantly of a high temperature. The chief of this deſcription in this country are the *Cheltenham* and *Scarborough* waters. The following are the contents of a gallon of the former.

Of a cryſtallized ſalt, compoſed of ſulphated	*Grs.*
ſoda and ſulphated magneſia —	480
— muriated ſoda ——	5
— muriated and carbonated magneſia	25
— ſelenite —— —	40
— oxyd of iron, nearly ——	5
	555

Together with	*Cubic Inches.*
Of carbonic acid — —	30.368
— an air, chiefly azot mixed with ſome hepatic — —	15.184
	45.552

Total—one ounce ſeventy-five grains for the ſolid contents; along with a pint and a half in bulk of the aëriform.——The Scarborough water is much of the ſame kind, but weaker in ſaline impregnation.

The Cheltenham water ranks very high in medicinal efficacy: on this ſubject the following intereſting

 remarks

remarks occur. ‘ This medicinal ſpring,’ the author obſerves, ‘ has been found of eſſential ſervice in the cure of glandular obſtructions, and eſpecially thoſe that affect the liver and the other organs connected with the functions of the alimentary canal. Perſons who have injured their biliary organs by a long reſidence in hot climates, and who are ſuffering under the ſymptoms either of exceſs or deficiency of bile, and an irregularity in its ſecretion, receive remarkable benefit from a courſe of this water, judiciouſly exhibited. Its uſe may be here continued even during a conſiderable degree of debility; and, from the great determination to the bowels, it may be employed with advantage to check the incipient ſymptoms of dropſy and general anaſarca which ſo often proceed from an obſtruction in the liver. All the effects which mineral waters can produce in ſuch diſeaſes may probably be commanded by the two ſprings of Cheltenham and Bath; but as the operation of theſe two differs very eſſentially, ſome judgment muſt be exerciſed in each individual caſe, to determine in what manner the uſe of each muſt be regulated. Often, too, it is neceſſary to employ the warm bath externally during the courſe of Cheltenham water; and this town is very well accommodated in this reſpect with artificial baths of any temperature.

‘ Among other chronic diſorders that are much relieved by the Cheltenham ſpring, we muſt enumerate a variety of ſcrofulous affections, in different parts; but as theſe often require the aſſiſtance of external application, the ſea has certainly here a very decided preference.

‘ Another claſs of diſeaſes in which the advantage of Cheltenham water is conſtantly experienced, is in ſome of the moſt diſtreſſing and painful affections of the ſkin, of the kind uſually termed ſcorbutic eruptions; that ariſe often without any very obvious

cauſe;

caufe; that chiefly depend on the habit of body, and make their appearance at ftated intervals in painful ulcerations on the fkin, producing a copious acrid difcharge of lymph, and an abundant defquamation. In common with other faline purgative fprings, this is found to bring relief in thefe moft haraffing diforders; but it requires to be perfevered in for a confiderable time, keeping up a conftant determination to the bowels.

'Whilft the chalybeate ingredient of this water probably affifts confiderably in enabling the conftitution to bear without debility a greater degree and a longer courfe of evacuation than with moft other medicines of this kind, it feems, however, probable that this circumftance will alter, and fomewhat impair the benefit which would arife from the iron alone; fo that the Cheltenham water cannot be ufed in every cafe where fimple chalybeate water is indicated. There are fome conftitutions which are naturally languid, or debilitated by difeafe, but which do not fhew any marks of obftruction, or thofe fymptoms that have been attributed to acrimony in the fluids; and thefe cannot bear with impunity any conftantly encreafed operation on the bowels. This fhews, therefore, the neceffity of fome caution and judgment in the ufe of this fpring. It is likewife often a queftion of fome moment, whether the patient fhould ufe the water fo as daily to encreafe in a fmall degree the natural evacuation from the bowels, or whether he fhould drink it only at intervals, and in larger dofes, fo as to be brifkly purged. Thefe are circumftances which, I think, are not always fufficiently attended to by the greater number of invalids, and would require the judgment of a profeffional man on the fpot.'

Another variety of chalybeate waters is to be mentioned; viz. thofe in which the iron is held in folution by a fixed acid; and this is always the fulphuric,

in the very few that are ufed medicinally. An inftance of this clafs is the *Hartfell* water, near *Moffat.* A wine gallon of this water, according to Dr. *Garnett's* analyfis, contains—

		Grs.
Of fulphat of iron	—	84
— fulphat of alumine	—	12
— oxyd of iron	—	15

This water is of ufe in bloody flux, bloody urine, fluor albus, gleets, &c.; and as an external application in old and languid ulcers.

The laft clafs of mineral waters mentioned, is the *Sulphureous*; or thofe which are fo ftrongly impregnated with fulphur, united either to hydrogen, or to an alkali, or to both, as thereby to acquire very fenfible qualities of fmell and tafte, and to become very powerful agents on the human frame. As fpecimens of the cold fulphureous waters, the only kind which this country poffeffes, are mentioned the celebrated fprings of *Harrogate* and *Moffat:* of the hot or thermal, the famous waters of *Aix la Chapelle,* and thofe of *Bareges* in the South of France.

The Harrogate water, when firft taken up, appears perfectly clear and tranfparent; it fends forth a few air bubbles, but not in any remarkable quantity. It has a very ftrong fulphureous and fetid fmell, precifely like that of a damp rufty gun-barrel, or bilge water. To the tafte it is bitter, naufeous, and ftrongly faline. It is, however, a remarkable inftance of the power of habit in reconciling the palate to the moft naufeous tafte, that moft perfons very foon come to drink this water without any difguft. This water lofes its tranfparency when expofed for fome hours to the open air, and becomes fomewhat pearly and rather greenifh to the eye; and at the fame time the fulphureous odour abates, and at laft the fulphur is depofited

depoſited in the form of a thin film on the bottom and ſides of the veſſel in which it is kept.

The whole contents of a wine gallon of this water are, according to Dr. Garnett, the following—

		Grs.
Of muriated ſoda	—	615.5
— muriated lime	—	13.
— muriated magneſia	—	91.
— carbonated lime	—	18.5
— carbonated magneſia	—	5.5
— ſulphated magneſia	—	10.5
		754.0

And for the gaſeous contents,		*Cubic Inches.*
Of carbonic acid gas	—	8
— azotic gas	—	7
— ſulphurated hydrogen	—	19
		34

Total—one ounce and a half and thirty-four grains of ſolid contents, and thirty-four cubic inches, or about eighteen ounces in bulk of gaſeous ſubſtances, of which about ten are ſulphurated hydrogen.

With reſpect to the medicinal virtues of this water, the author obſerves, ‘ that it is peculiarly from the cure of a number of cutaneous diſorders that the ſulphureous waters of Harrogate have acquired their high celebrity; and accordingly a very large number of the patients who reſort thither are of this claſs. In theſe complaints, the uſe of the water was formerly entirely confined to external application, and even then its efficacy was very fully eſtabliſhed. Modern practice has introduced a conſiderable improvement in employing this water largely as an internal medicine; and the union of the ſulphur with the neutral ſalts, in ſuch a proportion as to determine regularly and moderately to the bowels, appears to be a plan of cure well adapted to theſe troubleſome and often very

very obſtinate diſeaſes. If we compare the actual quantity of ſulphur contained in this compound form, with the ſenſible properties and peculiar action which this inflammable here exerts, we ſhall find that there is no form of combination in which it is ſo active, and ſo readily diffuſible, as in that of its union with hydrogen. It cannot be doubted but that this ingredient has a large ſhare in the cure of theſe cutaneous complaints, as we know the efficacy of ſulphur upon them when employed in other forms, though in much greater quantities. It is not my preſent purpoſe to enumerate all the varieties of cutaneous complaints that are found here: many of them are the ſmall pimply eruption ſo commonly met with, and called in popular language, though improperly, ſcorbutic; which are often produced by a ſudden application of cold either to the ſurface of the body or the ſtomach, or elſe ſeem to belong to the habit of body and ſtate of the ſkin, and appear periodically. It is not, however, merely to theſe that the uſe of Harrogate water is confined, for it is conſiderably, though not equally, ſerviceable in many of the more obſtinate and painful diſorders of the ſkin, ſuch as the elephantiaſis and leprous eruption. Theſe complaints receive material advantage in the uſe of the warm bath, which accordingly makes part of the plan of cure; and during its uſe very moderate doſes of the water, warmed, and repeated at proper intervals, will materially aſſiſt in keeping up that full perſpiration which is promoted by the bathing, and always kept up for ſome hours by confining the patient in bed, after immerſion, wrapped up in flannel. In this reſpect, however, the cold ſulphureous waters are not ſo advantageous as thoſe which are naturally hot; for the former, in being artificially warmed, muſt loſe ſome of the ſulphureous gas, on which part of their efficacy, even when applied externally, muſt depend. For this purpoſe, therefore, the hot ſulphureous baths of Aix la Cha-

pelle

pelle are certainly preferable: but we have no natural ſprings of this kind in our own country.

'Among thoſe diſorders in which both the ſulphureous and ſaline ingredients may be ſuppoſed to unite their valuable properties, we may mention the piles, and ſymptoms produced by ſeveral ſpecies of worms. The advantage of ſulphur, as a mild unirritating purgative, and one, perhaps, that continues its operation through the whole of the inteſtinal canal, has long eſtabliſhed its virtue in thoſe hemorrhoidal affections that require this evacuation; and the neutral ſalts with which it is united in this mineral water cannot but contribute to its efficacy. The effect of ſulphur in removing worms from the alimentary canal has been ſuppoſed, with ſome probability, to be that of deſtroying the animal; and if this be a juſt explanation, the diffuſive activity of the ſulphurated hydrogen will amply counterbalance the minuteneſs of quantity. However this be, we find that Harrogate water is a ſafe and often powerful remedy againſt the round worm and aſcarides, when taken in ſuch a doſe as to prove a briſk purgative; and in the latter caſe, alſo when uſed as a glyſter, the aſcarides being chiefly confined to the rectum, and therefore within the reach of this form of medicine.'

The *Moffat* water differs from the *Harrogate* in containing only muriated ſoda as a ſolid content, and that in ſmall quantity. In other reſpects they differ but little from each other.

Having thus gone through the individual mineral waters particularly deſerving notice, the author terminates the chapter by a ſynoptical table, ſhewing the compoſition of the mineral waters before noticed.

In the 5th chapter Dr. *Saunders* treats of the internal uſe of water as an article of Diet, and on its internal uſe as a medicine. Dilution of the circulating fluid is mentioned as one of the advantages of taking water

water freely in acute diseases, thereby preventing the tendency to the effusion of coagulable lymph in inflammation. This power, we may observe, of *thinning the blood* by diluents, has been denied to exist by the most acute physiologists. Just commendation is here bestowed on the Treatise of Dr. *Currie* on the subject of water as a remedy in Fever.

The 6th chapter treats of the external use of water, hot and cold. This subject has lately received so full an investigation from Dr. *Currie,* to whose book frequent reference is made in the present Treatise, that it will not be necessary for us to go much into particulars in this place. We may mention, however, the use of the cold bath in a case that frequently occurs in the metropolis, and other large towns.— ' There is a kind of slow irregular fever, or rather *febricula,* in which I have often found the cold bath of singular service. This disorder principally affects persons naturally of a sound constitution, but who lead a sedentary life, and at the same time are employed in some occupation which strongly engages their attention, requires much exertion of thought, and excites a degree of anxiety. Such persons have constantly a pulse rather quicker than natural, hot hands, restless nights, and an impaired appetite, but without any considerable derangement in the digestive organs. This disorder will continue for a long time in an irregular way, never entirely preventing their ordinary occupation, but rendering it more than usually anxious and fatiguing, and often preparing the way for confirmed hypochondriasis.

' Persons in this situation are remarkably relieved by the cold bath, and for the most part bear it well; and its use should also, if possible, be aided by that relaxation from business, and that diversion of the mind from its ordinary train of thinking, which are obtained by attending a watering-place.'

Amongst

Amongſt the diſeaſes in which cold bathing is ſaid to be generally prejudicial is *Chloroſis*; but to this opinion, we think, there are numerous exceptions.

The 7th and laſt chapter contains ſome general remarks on the ſubject, and which are of an intereſting nature. The author very properly cautions us, in eſtimating the effects of the foreign ingredients of mineral waters, to be aware of thoſe occaſioned by the water itſelf, and by other circumſtances, as regularity in diet, exerciſe, and the like. On the foreign contents and their mode of operation, eſpecially thoſe which are generally conſidered as forming the medicinal part, the author obſerves as follows. 'The chemical analyſis of mineral waters, amongſt ſeveral ſubſtances which appear to have but little effect on the human body, preſent us with a few, whoſe efficacy in the uſe of diſeaſe is undoubted, and which ſtand high in value on the liſt of materia medica. Every one, however, who compares theſe natural medicines with thoſe that are compounded by art, muſt be ſtruck with the ſmallneſs of the doſes that are employed of the former compared with the benefits which are produced during their uſe; and he might hence be apt to put a wrong value on their real efficacy, if he were not aware of ſome circumſtances which encreaſe to an unuſual degree the activity of theſe ſubſtances. One, which appears to me of no ſmall conſequence, is the extent of their dilution with water; for thereby, any medicine highly active in all ſtates, is diffuſed equally over the extenſive ſurface of the ſtomach, and is enabled to act all at once in the moſt advantageous manner poſſible. It is true that the force of impreſſion on any particular part is hereby leſſened, and therefore dilution may be carried to exceſs; but the circumſtance of extent of ſentient ſurface acted on at once, will probably, in moſt caſes, more than counterbalance this, and eſpecially, as the action is milder, the ſtomach may receive it much oftener. Another

advantage

advantage derived from this natural formula, is, that the very degree of dilution, as we have already mentioned, promotes, in many cafes, the general curative intention, as in the very weak folution of a purging falt, which occurs in Cheltenham or fea water. Befides thefe, we fhall find that fome of the foreign fubftances in mineral fprings, though highly active in themfelves, are never ufed under the fame form of compofition elfewhere than in thefe waters. This gives, in fome cafes, a fuperiority peculiar to thefe natural medicines. Of this kind is the carbonated iron, held in folution by carbonic acid, and the fulphur, by hydrogen gas. Thefe active medicines, likewife, happen fometimes to be found in a very fortunate ftate of combination to fulfil a complicated curative intention, as in the waters at Cheltenham or Aix.

'In afcertaining the comparative effect of the different contents of a mineral water, the gafeous fubftances that are combined with it deferve much confideration. For an accurate knowledge of thefe bodies, we are principally indebted to modern chemiftry; but it ftill remains for future enquirers to explain the precife operation of thefe fubtile agents. Some confiderations on this fubject I would fuggeft to the medical obferver.

'It appears to me, that by far the greater part of the action of thefe fubftances is that which is exerted directly upon the ftomach, and only, through the medium of this fenfible organ, upon the fyftem in general. A gafeous water appears to act more powerfully in proportion to the fuddennefs of the expulfion of the air, and therefore to the loofenefs of its adhefion to the water with which it is combined. Hence, the great relief found by taking mixtures in the act of effervefcence, where the carbonic acid is applied fuddenly, and in the gafeous ftate, to a large furface of the ftomach. Hence, too, the fudden effects fimilar to intoxication, caufed in many perfons by a

large draught of highly carbonated water, ſuch as that of Seltzer or Pyrmont.

'The force of action which ſubſtances exert upon the living fibre, as well as on a ſimple chemical mixt, depends upon the degree of diviſion of its parts; for by this, the ſenſible properties and active powers of every particle are brought in action at the ſame time, and are capable of being extended over a large ſurface. This diviſion of parts is brought about either by mechanical means or by ſolution; by the latter it is effected more completely, but then the affinities of the ſolvent often oppoſe the combinations which would otherwiſe be formed by the ſubſtance held in ſolution. This we know to be the caſe with the moſt ſubtile ſtate of diviſion which we are acquainted with, that of the ſolution of a body in the matter of heat, or what is ſuppoſed to conſtitute a gas; for in this ſtate the baſis of the gas, though moſt intimately divided, is often held by too ſtrong an attraction for the caloric, to be ſo ready to enter into a new combination as if it were in a liquid form. But again; chemiſtry furniſhes many examples of the activity of combination being the greateſt, juſt at the time when a body has quitted its union with a ſolid or liquid, and is beginning to aſſume the aeriform ſtate, or what has been called the *naſcent* ſtate of gas. If then we ſuppoſe that the force of impreſſion which any agent exerciſes on a living body holds any relation with its eagerneſs for chemical affinity, it will not perhaps appear improbable, that we may partly attribute to the above cauſe the energy with which many of the gaſeous mineral waters act upon the ſtomach: for water, impregnated with the baſis of any gas, is conſtantly giving off this foreign ingredient in the aeriform ſtate as ſoon as extraordinary preſſure is taken off; and eſpecially when a heat like that of the ſtomach is ſuperadded. The actual quantity of the baſis of any gas (the carbonic acid, for inſtance) contained in any mineral water, does not appear to

to be of ſo much conſequence to its powers as a medicine, as that which will be ſpontaneouſly given off in the gaſeous form when it enters the ſtomach. Many ſubſtances, ſuch as lime, magneſia, and the alkalies, will detain a large quantity of carbonic acid, and thus leſſen the proportion of that which is uncombined, and diminiſh the medicinal powers of the whole, as far as they depend on this acid. On the other hand, a very pure water, ſuch as that of Briſtol, holding little in ſolution that can detain carbonic acid, will give out in the ſtomach almoſt the whole of this ſubſtance which it poſſeſſed, and thus be in fact equivalent in medicinal powers to an impure water much more ſtrongly carbonated.

'I have juſt mentioned, that it appears to me probable, that by far the greater part of the operation of the gaſeous bodies is confined to the ſtomach, and acts only indirectly upon the whole ſyſtem. This is particularly ſo with the carbonic acid, the moſt common and the moſt important of theſe ſubſtances in a medical view. Many of its effects are obviouſly ſuch as concern the ſtomach only, ſuch as that of checking a tendency to vomiting, for which an effervefcent draught has been found remarkably efficacious. The giddineſs and ſpecies of intoxication from Pyrmont and Seltzer water, is probably produced through the medium of the ſtomach; as theſe effects are particularly felt when this cavity is empty, and come on very ſuddenly, even before the vertigo and head-ach, which, as we have mentioned, alſo frequently follow a full doſe of this water. A good deal too of the gas that is emitted copiouſly from the water when in the ſtomach, paſſes up through the mouth in troubleſome eructations. It cannot be doubted, however, but that part of theſe gaſes are abſorbed into the circulating ſyſtem, along with the water that conveys them into the ſtomach; and, by entering the circulation, may prove very important remedies, according to the nature of the ſubſtance abſorbed. The

ſulphurated

sulphurated hydrogen appears to be very extensively circulated through the minute vessels of the body, and to perform a longer course unaltered than the carbonic acid. At least we have more direct evidence of its penetrating nature and great diffusion, from the odour of sulphur which exhales through the pores of the skin, and its effects in blackening silver worn about the person, even when the sulphureous water is used only internally, but long persisted in. These medicines are, however, also locally useful in the stomach, as is found from long experience.'

ART. LXV. *A second Essay on Burns, in which an Attempt is made to refute the Opinions of Mr.* EARLE, *and Sir* W. FARQUHAR, *lately advanced, on the supposed Benefit of the Application of Ice in such Accidents: with Cases and Communications, confirming the Principles and Practice brought forward in a former Essay. Also Proofs, particularly addressed to Surgeons of the Army and Navy, of the Utility of the stimulating Plan in the treatment of Injuries caused by the Explosion of Gunpowder. By* EDWARD KENTISH, *Author of the former Essay.* Octavo. 117 pages. Price 3s. London, 1800. MAWMAN.

IN our account of Mr. *Kentish*'s first Essay on the subject of Burns,* we gave a detailed view of the practice recommended by him, and of the principles on which he supposed the practice to rest. Although we were not convinced of the truth of the latter, we did not feel inclined, on that account, to question the result of his experience, which, we were ready to admit, awaited only the sanction of other practitioners to confirm it an important improvement of the

* *Vide* Med. & Chir. Rev. v. 4, p. 432.

healing art. In the Eſſay before us, the author ſeems to wonder that his opinions have not attracted the general notice of practitioners. The pamphlet of Mr. *Earle* on the ſame ſubject, publiſhed a conſiderable time after that of our author, ſhews at leaſt that neither Mr. *E.*, nor his friend Sir *Walter Farquhar*, two gentlemen that enjoy an ample ſhare of the public confidence, had adopted the ſtimulant mode of treatment; whether from their not having met with the pamphlet of Mr. *K.*; from inattention to its contents; or from the event of their own comparative trials, we cannot determine. It is reaſonable, however, to imagine, that a practice ſo bold and decided, and ſo oppoſite to that in common uſe, would have excited the attention of a perſon writing on the ſubject; and therefore we muſt ſuppoſe Mr. *Earle* to have been ignorant of Mr. *Kentiſh*'s labours in the ſame field with himſelf; a ſuppoſition that ſpeaks but little in favour of his attention to the occurrences of the medical world. The unacquaintance of other practitioners *of note* with the ſubject in queſtion is curiouſly pourtrayed, in the relation of a converſation that paſſed between Dr. *Blane*, Dr. *Johnſton*, and Mr. *Bell*, when the latter was examined on his qualification as a ſurgeon for the navy.

"Having mentioned ſcalds and burns among the accidents during our cruize, Dr. *B.* ſaid,—'Pray, Sir, how did you treat them?' I replied,—'By bathing the affected parts with oil of turpentine.'—'Oil of turpentine! Good God, Sir! that is a practice I muſt condemn in the ſevereſt terms; and I think *you*, Dr. *Johnſton*, will agree with me in reprobating it.'—Dr. J. ſaid, he never heard of ſuch a remedy before, but aſked, on what principle, or theory, I could juſtify it? I ſaid, that, when a perſon had any member ſo much expoſed to ſevere cold as to become *froſt-bitten*, it was uſual to apply, firſt, ſnow or ice, and afterwards cold water, before any degree of ſenſible heat could be borne without injury; that, for the ſame reaſon, when a part

a part had been violently ſtimulated, it was equally neceſſary to bring it by degrees down to the healthy ſtandard; that this object was beſt accompliſhed by the application of a ſtimulus a little leſs violent than that which has cauſed the diſeaſed action; and that the *ol. terebinth.* had been found by experience equal to produce that effect.—' On what experience?' ſaid Dr. *B.* ' On that of Mr. *Kentiſh,* of *Newcaſtle,* who has written an Eſſay on the ſubject, in which the ſuperiority of this method of practice is proved beyond a doubt, at leaſt in my opinion.'—Dr. *B.* ' Does it (meaning the oil of turpentine) not produce great pain?' *Anſ.* ' Not in the leaſt; on the contrary, it is ſoothing and agreeable to the patient.'—I then narrated to them the caſe that Mr. *Anderſon* communicated to you, where the patients were *flayed* from head to foot.''

In the ſecond chapter Mr. *Earle*'s Eſſay is noticed, our author taking occaſion to criticiſe the principles there inculcated, and denying altogether the efficacy and utility of the cooling proceſs. We are here, however, more concerned with the proofs brought forward in ſupport of his own practice. Mr. *Anderſon,* a ſurgeon of Newcaſtle-upon-Tyne, obſerves, that he had not had any opportunity of applying the ſtimulant plan in any deſperate caſes of burns; but in the ſlighter or ſuperficial caſes of burns he has found it ' act like a charm;' and he recites the following caſe, where the *ol. terebinth.* and cold water were uſed at the ſame time, but on different parts.——' A lady, in endeavouring to remove a pan from the fire which contained boiling fat, had the misfortune to receive ſome of it on her right arm and face. I ſaw her a few minutes after the accident, about nine o'clock in the morning; ſhe was ſitting on the floor, and her arm was immerſed in a pail of cold water; her face was fluſhed, and appeared much ſcalded, and ſhe complained of great heat and pain. I immediate-

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ly applied the *ol. terebinth.* to it, and continued it for a few minutes. She ſaid that her arm was ſo much relieved by the water, and that it had ſucceeded ſo well in a former accident, that ſhe wiſhed to continue it for a few hours. I ſaw her about four o'clock in the afternoon; her face looked much better, and was eaſy: ſhe had continued the immerſion, *often* changing the water; but when her arm was taken out, though only for a minute, ſhe complained much of the pain; *indeed*, it appeared that the inflammation was increaſed. I recommended an emollient poultice, after ſhe ſhould be tired of the cold water. In the morning I called again, and was informed that the pain of the arm had been great during the night. The inflammation had extended above the elbow, ſeveral large veſications had been opened, and deep ſloughs formed on her hand and arm. I applied a digeſtive ointment to theſe parts, and a large warm poultice over the whole. The face was perfectly eaſy, and had no veſications, but the cuticle was a little abraded. I ſcarcely need add, that the arm required dreſſing daily for a fortnight after the accident.'

The next teſtimony adduced in favour of the ſtimulant mode of treatment is that of Mr. *Stephen Hammick*, Jun., who, in a letter to the author, obſerves as follows:—" During the laſt ſeven years, whilſt I was employed as an aſſiſtant ſurgeon at the Royal Naval Hoſpital at Plymouth, I had frequent opportunities of having under my care and management a number of men who had been ſeverely burnt by the exploſion of gunpowder. At the beginning of this war it was our general practice to keep the parts conſtantly wet, either by vegeto-mineral water, crude ſal-ammoniac waſh, or vinegar. Although theſe applications gave our patients eaſe for a time, yet this eaſe was not of long duration, neither were the benefits derived ſuch as to ſatisfy our minds of their utility; as we found that our patients did not receive thoſe permanent beneficial advantages which had been attributed to them; we,

we, therefore, had recourſe to rectified ſpirits of wine, in which was diſſolved a pretty large quantity of camphor: this mode ſucceeded more to our wiſhes. But when your ingenious Treatiſe on Burns fell into my hands, I reſolved to put it to the trial in the firſt recent caſe of burn that preſented itſelf, and, unfortunately, I had not long to wait for ſuch an one; to which I immediately applied the ſpirit of turpentine in a full and free manner (though I muſt admit that I did not give my patient, internally, the liberal allowance of ſpirit and laudanum which you ſo forcibly recommend). The application of the turpentine *was attended with much burning and ſmarting*, as the patient expreſſed it, for about an hour: at the expiration of it he fell aſleep, and reſted tolerably about two hours; and, when he awoke, he declared that he found himſelf much relieved. No ill ſymptoms ſupervened, and the proceſs to ſuppuration in this caſe was rather more rapid than in any I had before witneſſed. *The after ſtages, however, were nearly, if not quite, as ſlow* as in thoſe patients who had been treated by the cold applications. Prompted by the ſucceſs of this caſe, I tried it in ſeveral others, and with equally beneficial effects; and, from ſtrictly watching and minutely attending to burnt patients (my reſidence having been within the walls of the Hoſpital for more than ſeven years), I am decidedly of opinion, that the practice of applying immediately to burns the ſpirit of turpentine is the beſt I have ever yet ſeen adopted, as the proceſs to ſuppuration is in general more rapid, and thoſe irregular marks or ſeams found after other applications are not to be met with after the turpentine; neither is the ſkin ſo diſpoſed to crack, or break open again, as was formerly too often the caſe, an event producing the moſt troubleſome and irritatable ſores."

Theſe obſervations, the reader will perceive, are not quite ſo decidedly in favour of the mildneſs and general efficacy of the ſtimulant plan, as the caſes detailed by the author himſelf; but this is attributable, per-

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haps, to the neglect of combining the proper *internal* with the *external* method of treatment.

Mr. *Horn*, Surgeon to the *Newcaſtle Infirmary*, ſpeaks ſtrongly in favour of the ſtimulant mode of cure. The *ol. terebinth.*, in ſome caſes here recited, ſeemed to diminiſh the pain conſiderably; but the uſual trifling applications only had been before made.

Mr. *Fiſe*, Surgeon of the ſame place, obſerves, that he has had frequent opportunities of trying the *ſp. terebinth.* as an external application in ſcalds, and has found the reſult uniformly favourable. Mr. *Bell*, of Cheſter-le-Street, ſpeaks to the ſame purpoſe.

In an Appendix, ſix caſes are related by Mr. *George Wilkinſon*, of *Sunderland*, which place the mode of treatment here recommended in a very favourable point of view, both with regard to eaſe and celerity of cure.

The following caſe, by Mr. *Frederick Horn*, will ſerve to explain the treatment in the different ſtages of the affection.

" *George Smith*, an under-viewer in *Ravenſworth Colliery*, was ſeverely burnt, on the 3d of July, 1800, by a quantity of inflammable air taking fire in the pit, into which he had juſt deſcended to give directions to the workmen. The exploſion was ſo violent as to drive off ſtones, &c., to the top of the ſhaft (above ſixty fathoms); and the ſhock was felt, and the report which accompanied it was diſtinctly heard, by ſome farmers who were in bed in their houſes, at ſome diſtance from the place.

" I found him, two hours after the accident, with his hair ſinged cloſe to his head. The whole cuticle was peeled off from his face and neck, which were quite black with the fine coal-duſt, which had been ſo forcibly driven upon them. He was burnt in different places about his loins, and from the knees to the ancles, except ſome ſmall patches where the ſkin had only been ſcorched.

" On looking at his hands, I was ſhocked with their appearance: on taking hold of them, the ſkin and nails

nails came off exactly like a torn glove, and the extenſor tendons of the fingers were bare in ſeveral places. In ſhort, he was the moſt ſeverely burnt of any patient who ever came under my care.

" Nothing had been done to him before I ſaw him, as he had only juſt been brought home. He had frequent ſhiverings; and, although a very reſolute man, complained much of pain, and thought he muſt have been injured in his lungs, from the ſenſe of heat he felt there, and from the bad taſte in his mouth.

" There was ſome ſtrong gin and water on the table when I went in, and I immediately gave him a large tumbler glaſs full of it. I warmed ſome oil of turpentine by holding a cup of it in boiling water, and I directed the attendants to bathe him aſſiduouſly with it, by means of probes armed with lint, and dipped into the ſpirit. This was continually done while I was employed in ſpreading plaſters (viz. *ung. reſin. flav: c. ol. terebinth.)*, and the poor man found much relief from it. He, however, complained much of his hands, which were very painful, and ſmarted at the time of the application, but ſoon had a much eaſier feel. I applied the plaſters to every part where I ſuſpected the fire to have reached, gave him another glaſs of ſtrong gin and water, to which I added ſixty drops of laudanum, and I deſired he ſhould have more of the ſpirit if the ſhiverings ſhould recur.

" In the evening I found him tolerably eaſy, and, conſidering his ſituation, wonderfully ſo. He had been my patient fourteen years ago, when he had been pretty much burnt, although not near ſo ſeverely as at this time; and had then been treated with *ol. lin. c. aqua. calcis.*, to which a portion of the *tinct. opii.* had been added; and he remarked, ' that the fire, he thought, ſeemed likely to be killed ſooner now than before.' He had taken gin and water only once ſince morning, when he had a return of the ſhivering, and his attendants had moiſtened the plaſters with *ol. terebinth.* at his own requeſt, from the relief he thought

he felt from it. I gave him ſixty drops of laudanum in a little ſpirit and water, to be taken at bed-time.

"In the morning I found he had had a tolerable night; I removed the plaſters, and found ſome ſlight appearances of ſuppuration, particularly on the face, where a lardaceous appearance had taken place, but of a black colour, from the coal-duſt. I bathed the burnt parts again with *ol. terebinth.*, renewed the dreſſings, and allowed him gin and water, to be taken when ſhivering (which now and then threatened him) ſhould occur. At night he took ſixty drops of laudanum; his bowels kept open, and he made no complaint except in his hands.

"*Third day.*—There is a tolerable ſuppuration on the face, neck, body, and legs. The blackneſs from the coal-duſt, which appears to be firmly attached to the cutis, is ſeparating faſt, in the form of black lard: he remarks, that the fire is killed every where but in his hands. He was dreſſed with *ung. reſin flav.*, with leſs proportion of *ol. terebinth.* He is forbid the uſe of ſpirits, but allowed porter as far as three pints in the twenty-four hours, if he chuſes ſo much. His anodyne is continued.

"*Fourth day.*—The ſuppuration in the face, body, and legs, goes on well, and ſeveral parts are now turning florid, as the blackneſs diſappears. The ſcorched parts have neither bliſtered, nor run into ſuppuration. There is a large diſcharge of ichor from the hands; and on ſome parts of the fingers there is ſtill a thick gelatinous matter adhering. His allowance of porter is continued. He has no ſhiverings. Dreſſings are changed for *cerat. e lapid. calamin.* Anodyne continued.

"*Fifth to the eighth day.*—Going on well; treatment continued; bowels open: allowance of porter diminiſhed to a pint and a half per day.

"*Ninth day.*—Suppuration large; all the blackneſs gone off; diſcharge from the hands ſtill thin, and in great quantity, attended with much pain. Prepared chalk,

chalk, finely powdered, is ordered to be ſprinkled on all the ſores, covering it with *cerat. e lap. calamin.* ſpread on rags. He is to take five grains of calomel at night, and to have a purge in the morning.

"In the afternoon I was ſuddenly ſent for to him: the pain in the hands was intolerable, and he had two ſmall ſhivering fits. Having never before ſeen chalk applied, I attributed the pain to its uſe; but, on taking off the dreſſings, I found my aſſiſtant had not applied any of it to the hands. He had uſed it liberally to the face, neck, body, and legs, and theſe parts were *perfectly eaſy.* I ordered emollient poultices to be applied to the hands and arms, and renewed every eight hours. The chalk was continued to the other parts.

"*Tenth and eleventh days.*—The treatment continued. Pus on the face, neck, and legs, of good conſiſtence, and no pain in theſe parts. The hands are eaſier after the poultices are firſt applied, but ſoon become ſo painful, as to make him urgent for a renewal of them; and, when they are taken off, the diſcharge of thin matter pours from them. Finding the chalk agree ſo well with the other parts, I ſprinkled his right hand freely with it, and covered it with the cerate plaſters. He felt, as he ſaid, a little tingling from the application, and wiſhed to have the poultice continued to the left hand. I was glad of the opportunity of making this comparative trial, and allowed it to be ſo.

"*Twelfth day.*—Head, neck, and legs, much better; loins nearly healed. I ſpeak within bounds, when I ſay four ſquare inches of ſkin have been beautifully formed on one leg ſince yeſterday. I know no term which will give ſo good an idea of this proceſs as *icing over;* the extent covered, and the ſmooth ſhiny appearance being ſo like an icy pellicle formed on a ſmooth piece of water.

"*Fifteenth day.*—Face and legs mending faſt; loins well; his hands completely raw, and bleeding from

from every point; the poultice on the left hand is deluged in thin matter, and this hand is by far the moſt painful. The right hand, covered with the chalk, although painful, is not nearly ſo much ſo as the left, and the man is anxious to have the chalk applied to it, which is allowed. Anodyne continued; five grains of calomel at night, and a ſmart purge to be taken early in the morning.

" *Sixteenth day.*—Has had two copious evacuations from the calomel and purging powder: every part better; the left hand much eaſier, but the granulations much looſer than the right; they bleed more readily, and are more painful.

" *Seventeenth day.*—One leg quite ſkinned over; face, and other leg, much better.

" *Twenty-firſt day.*—The face and neck quite ſkinned over, except a ſmall part of each eyelid, and the noſe; right leg almoſt healed; right hand ſkinned over from above the wriſt to the ends of the fingers on the inſide, and much better on the back part; left hand, to which the poultice had been ſo long applied, begins to grow better, but is far behind the other, ſo as to give a moſt decided preference to the chalk. He is now ſo well, that I have allowed him to go into his garden."——

We have thus furniſhed our readers with the moſt material evidence adduced by the author in ſupport of the ſtimulating method of treating accidents from fire, and which really ſeems to eſtabliſh its preference, not only to the ordinary modes of cure, but even to the uſe of ice and other cold bodies, or what the author chooſes to call the *paralyzing* cure. We ſtill conſider the objections to the latter, however, as founded in hypotheſis, rather than experience; for the teſtimonies adduced in its favour, by different practitioners, are too ſtrong to be overturned by any argument employed againſt it in the pamphlet before us; whilſt the

the facts do not warrant the inference the author draws of the excluſive utility of the ſtimulant plan.

His notion is, that the violent action induced by the injury ſhould be reduced in the moſt gradual manner, by the application of *ſtimuli* a little leſs only in degree than the one which produced the miſchief, for the purpoſe of preventing that *dangerous torpor* which he ſuppoſes would take place, if the violent action was too ſuddenly allowed to ceaſe. Thus, for example, if water heated to the degree of 212°, or the boiling point, occaſioned the injury, the ſame fluid heated only to 200°, ſo far from being a ſtimulus in compariſon with that which cauſed the miſchief, is in fact 12° of cold, and, according to the author's hypotheſis, ſhould be the moſt proper application 'to prevent the too ſudden diminution of the violent action cauſed by the injuring ſtimulus.' From the following paſſage it is evident that Mr. *Kentiſh* has been led to adopt his theory from a fancied analogy between the effects of the oppoſite extremes of temperature, as applied to the living body.—'What to me,' he obſerves, 'is one 'of the moſt convincing proofs of the truth of the prin'ciples I wiſh to be made known, is, that the *inverſe* 'of them is proved to be true by the experience of all 'countries ſubject to a diminiſhed temperature'—alluding to the practice of applying ſnow to a frozen limb. That the ſudden increaſe of temperature to any conſiderable degree is highly dangerous in the caſe now mentioned is ſufficiently aſcertained; but it is not proved that other *ſtimuli* are equally prejudicial with heat. And, on the other hand, according to the author's principles, the application of ice to a ſcalded part ought to occaſion its certain deſtruction;—but is it ſo? The eaſe ſucceeding the application, and the general termination of ſuch caſes, are ſufficient proofs of the *innocence*, at leaſt, of the cooling plan.

There is no analogy, therefore, in the two caſes that can 'afford a convincing proof of the truth of the principles he wiſhes to be made known.' The merits of the new

new practice muſt reſt on the ſure baſis of experience, and not on the hypotheſis here ſuggeſted.

We ſhall conclude our account of the work before us with a brief recapitulation of the means recommended by the author, the utility of which, we hope, will be confirmed by future trials.

He divides injuries from fire into two claſſes; that where the action of the part is only increaſed; and that where ſome parts have increaſed action, and others are deſtroyed.—'In the firſt ſpecies,' the author obſerves, 'I have not found any thing better for the firſt application than the *heated ol. terebinth.* and the digeſtive thinned with the ſame. In ſuperficial burns, when the *pain* has ceaſed, it will be adviſable to deſiſt from this application in about four-and-twenty hours, as that time in many caſes will be ſufficient; and at the ſecond dreſſing, a digeſtive ſufficiently thinned with common oil will be adequate to the caſe; and on the third day to begin with the *ceratum e lapide calaminari.* I have frequently ſeen ſecondary inflammation excited by the remedy, which in the firſt inſtance puzzled and perplexed me conſiderably: I have likewiſe been informed of this conſequence by ſeveral gentlemen. The moſt certain *remedy* for this unpleaſant ſymptom is to apply a plaſter with digeſtive thinned with oil, or a plaſter of cerate, and over that a *large warm* poultice. This moſt effectually takes off the irritation of the part, and the cerate will finiſh the cure. Should there be much uneaſineſs of the ſyſtem, an anodyne proportioned to the age of the patient ſhould be given. And it may here be remarked, that large anodynes in ſuch caſes ought to be uſed, as they always produce the happieſt effects; and I have never ſeen any ill conſequences from them, though given in a much greater extent than I ever dared in any other circumſtances (except in ſome caſes of tetanus, where no good aroſe from their uſe).

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'In the second species, or in those cases where some parts have increased action, and other parts are destroyed, for reasons already assigned, it will only be necessary to pay attention to the living parts; and as those parts will come under the denomination of parts having increased action, the same means must be used as in injuries of that species. The internal treatment should be more strictly attended to in these cases, as in considerable accidents, where large eschars are formed, the system has several different processes to go through before it is again rendered perfect. In each of those states it may be considerably assisted by art. The immediate increased action on the surface is to be kept up by a high temperature; and the equilibrium of the exhalent and absorbent system should be continued by exciting artificially, by every means in our power (spirit of turpentine is the most effectual I have yet found), the absorbent vessels of the injured part, to equal the increased action of the corresponding secreting system. When parts of the surface are destroyed, and eschars formed, we must judge of our treatment of those by the appearance of the parts *less injured;* for as soon as secretion takes place on the least injured parts, we may rest assured that the stimulant plan has produced its beneficial effects; for the separating of the eschars is a process of the system, to assist which is our duty; but we must here make a distinction between assisting and hurrying. I have formerly fallen into this error myself, and have rendered the sores extremely irritable by too great an anxiety to urge them to throw off their sloughs. I am now less anxious in that respect, finding the less injured parts a certain criterion for the mode of treatment to the others. When stimulants are indicated to be desisted from by the appearance of the one, I desist from them in the other; always finding the system adequate to complete her work. If it require more time, it produces less distress, and in the *end* facilitates the cure, as the ulcers after-

afterwards heal much more readily, being lefs *irritable.*'

An important improvement in the practice refpects the means of repreffing the growth of fungus, and the profufe difcharge of matter which accompany accidents of this defcription. Thefe ends are effectually obtained by fprinkling powdered chalk on the furface, and by the ufe of purgatives in the latter ftages. Care muft be taken that the chalk is very finely levigated.

ART. LXVI. *Communications refpecting the external and internal Ufe of Nitrous Acid; demonftrating its Efficacy in every Form of Venereal Difeafe, and extending its Ufe to other Complaints: with original Facts, and a Preliminary Difcourfe, by the Editor,* THOMAS BEDDOES, *M.D.* Octavo. 215 pages. Price 4s. London, 1800. JOHNSON.

THE cure of *Lues Venerea* by the Nitrous Acid, and other analogous remedies, has, for a time, ceafed to engage the general attention. Other objects, more novel or more interefting, have, poffibly, called afide the views of practitioners; yet the ill fuccefs which was found to attend the trials that were made in the metropolis, and elfewhere, doubtlefs contributed not a little to fet the fubject at reft. It feems, however, to have *repofed* only, not *flept*, to appear with renewed energy in the work before us.—The Communications here prefented to us, and which feem to be the refult of much and impartial enquiry, juftify the editor in faying, that they *demonftrate* the efficacy of the Nitrous Acid in every form of the difeafe. At the fame time, the failure of fo many practitioners, in fituations that afforded them the moft ample opportunities for inveftigation, is a problem we

we ſhall not pretend to ſolve. Fallacy or miſrepreſentation muſt attach ſomewhere.

In a preliminary diſcourſe, that occupies more than ſixty pages, the editor endeavours to aſſign the reaſons why the acids were ungraciouſly received in England, and particularly in London, as anti-venereal medicines. The ſlow and progreſſive effects of the remedies in queſtion, and the difficulty in adjuſting the doſes, and of carrying them to the requiſite extent, may have defeated the attempts of the practitioner to effect a cure. Much, too, as might have been expected, is attributed to ſelfiſh and intereſted motives, as deterring ſurgeons from a fair and impartial examination of the ſubject: but we feel no inclination to dwell on illiberal inſinuations of this ſort; we have already heard too much of them.

Several experiments are brought forward by the editor in this part of his work, which evince, in the moſt ſatisfactory manner, the power of the acidulated bath to induce ſoreneſs of the gums very ſimilar to that which mercury occaſions. The ſtrength of the bath varied from 12 to 24 ounce meaſures of ſulphuric acid of commerce to about 80 gallons of water: the heat between 90° and 96°. Various proofs of the ſame being effected by the nitric acid are contained in the ſubſequent part of the volume, and will be hereafter noticed.

Mr. *James Mac Gregor*, in a letter to the editor, gives proof of the permanency of the cures formerly effected by the nitrous acid, as publiſhed in the firſt collection of caſes. More than a year, he obſerves, had elapſed ſince the former account, during which the patients had been always under his eye. The ſymptoms did recur in two of the caſes; in all the others the cure was perfect. He mentions fourteen other venereal caſes, in which he employed the nitrous acid, two of them of ſome ſtanding, and with ſecondary ſymptoms; the reſt were caſes of recent infection. Of theſe, nine were cured at the time of writing;

writing; three were under cure; and with two the acid failed, though from caufes, it is obferved, that could be readily affigned; thefe, however, are not mentioned. This gentleman remarks generally, that in gonorrhœa the acid has not been fo fuccefsful in his hands as in lues; that the gums feem to be more eafily affected by the acid in India than in Europe; that by bathing in it, the mouth appears to be fooner affected than by taking it internally; and that he thinks the lues runs its courfe more rapidly, and appears with more inveteracy than in Europe. He obferves, that he has met with the greateft fuccefs by treating dyfentery, as well as hepatitis, with the nitrous acid; and that, when the patient applied early enough to allow time for the acid to affect the mouth, he never loft a cafe in either difeafe.

Dr. *Scott*, in a letter to Mr. *Mac Gregor*, gives an outline of five well-marked cafes of fyphilis, for which he employed the nitrous acid with fuccefs. They were among the earlier cafes treated by him in this way, and fo far evince the permanency of the cures. He does not think that the cures effected by the acid are lefs to be depended on, when the remedy has been given for a proper length of time, and where it has fhewn fufficient indications of its having affected the mouth and the whole fyftem, than thofe from mercury. The leaft favourable cafes for the acid are thofe where mercury has failed: in thefe, he obferves, it will often fail.

The next communication on the fubject is by Dr. *Keir*, from *Bombay*. A confiderable number of cafes are here given, which incline the author to admit, beyond a doubt, the merits of the nitric acid, whether externally or internally ufed, as an antidote againft the venereal poifon in its primary, and very generally in its fecondary, ftages.

Mr. *Steuart*, in a letter to Dr. *Scott*, tranfmits feventeen cafes of venereal affections treated with the nitric acid. The general refult of this gentleman's

expe-

experience is thus ſtated: 'Wherever I have uſed the nitric acid, it has almoſt uniformly improved the general health, even in the moſt obſtinate caſes of confirmed lues, where the conſtitution has been almoſt deſtroyed by diſeaſe, and repeated courſes of mercury, and where it has failed to produce a cure. I have not found that the acid uniformly inflames the gums, and produces a flow of saliva; but I have often found it do both, whether applied to the ſkin, or taken into the ſtomach. The effects of bathing have been in every reſpect ſimilar to thoſe produced from drinking the acid; and in the two recent caſes, when the feet and legs were only bathed, the cure proceeded as rapidly as it generally does, either under the uſe of mercury, or the internal uſe of the acid, and certainly more agreeably.

'To conclude: In all the caſes of recent infection, in which I have truſted entirely to the uſe of nitric acid, whether externally or internally applied, I have not as yet met with one inſtance of relapſe; and in ſecondary caſes, where I have given it what I conſider a fair trial, and failed ultimately, I do not now recollect one in which a permanent cure has been eſtabliſhed by any other means.'—The uſual quantity of the acid exhibited internally in theſe caſes ſeems to have been about half an ounce daily: the acid bath was prepared by adding three pints of the acid to about thirty gallons of tepid water.

Mr. *Boag*, of Bombay, recites ſix caſes of recent venereal infection, ſelected from a number of others on account of their being the worſt caſes, where the nitric acid bath only was made uſe of, and in which cures were effected. The bath, it is obſerved, was but weakly impregnated with the acid, and only about half the patient's body was immerſed in it. It was uſed only once daily. Mr. *Boag* remarks further, that he has frequently employed the ſame

medicine internally, in cafes of confirmed lues, where mercury had failed, and that by means of it he has cured fome, and relieved others.

Mr. *Grieve*, furgeon to the 77th regiment, says, he has employed the acid with the fulleft fuccefs in feveral cafes of lues, where mercury in every form had been repeatedly ufed to no purpofe. The evidence of Mr. *Bridon* is lefs decifive. This is alfo the cafe with that of Mr. *Kennedy*, with regard to fome hepatic affections.

A letter from Dr. *Scott* to the editor is next given, containing a confiderable number of cafes, furnifhed by different medical gentlemen in the Eaft Indies, which point out the good effects of the nitric acid, not only in fyphilis, but in fcurvy: thefe are preceded by a general account of the effects obferved from the nitric bath, and a flight fketch of the difeafes of that country, for which he expects it might be ufeful. The following account of the author's own trial of the bath is interefting.

'I bathed to-day he obferves, in a wooden tub, which contained water acidulated with nitric acid. The bath was made about the temperature of the fkin. The whole furface, as high as the neck, was covered, and I remained in it for half an hour. I feel no particular effect from this bath. It is as agreeable as water, and it cleans the fkin much more effectually.

' 28th—I bathed again to-day. I took out a part of the bath, and then added to it hot water and nitric acid. It was above the temperature of my body, and as ftrongly acid as the fkin could well bear it. I ftaid in the bath half an hour, and feel no particular effect from it.

' 29th—Juft after I had written the report of yefterday, and in lefs than half an hour after I came out of the bath, I felt, very unexpectedly, fome pain in my gums, and I thought that I was inclined to fpit more than ufual. I was difpofed to attribute this to the effects of imagination. To-day I put into the

the bath, as before, ſome more acid with hot water. The bath was rather below the temperature of the ſkin. The pain in my gums, teeth, and jaws, was very ſenſible during the remainder of this day; and at times there is a ſecretion of ſaliva to an uncommon degree.

'30th—I prepared my bath as before. It was rather warmer than the body; I remained in it half an hour. I feel, ſince yeſterday, a pain in my throat, which is attended with ſome difficulty of ſwallowing. I have an unuſual diſpoſition to ſpit; my gums, both above and below, are ſomewhat painful; I am otherwiſe in good health.

'May 1—Since yeſterday I have felt a good deal of pain in the throat, eſpecially on ſwallowing; and during the whole of this forenoon I had a ſenſation of burning over the roof of my mouth and down the œſophagus. This ſenſation reſembles what ariſes from having chewed an acrid vegetable ſubſtance, and is ſo diſagreeable, that, if it be not diminiſhed, I ſhall uſe the bath no more after this day. I remained to-day in the bath half an hour: it was ſo ſtrong as to make my ſkin ſmart in many parts.

'May 2—My mouth, though not ulcerated, is painful. I am ſufficiently ſatisfied of the powers of this bath, and ſhall uſe it no longer. I find my digeſtion much improved from it, and I am ſenſible that the liver, unclogged by diſeaſe, is performing its functions with uncommon facility.

'It ſhould be obſerved, that during the days that I bathed, the thermometer in the day time was commonly from 92° to 96° in the ſhade, and that I had on my ſkin a good deal of that excoriation (for it is not an eruption) that we call the prickly heat. This, no doubt, by removing the protection of the cuticle, has made the action of the bath much more rapid than it would otherwiſe have been.

'June 11th—For a fortnight after giving over the bath, my mouth continued ſore, and the ptyaliſm at

 times

times was confiderable. My pulfe, which fhould have not been more than 85 in a minute, was generally as high as 96, and often above 100. I felt, at times, an unufual languor, and I got confiderably thinner. There was an uncommon fenfibility about me. I am inclined to attribute feveral of thofe effects, in fome meafure, to the great heat of weather. At the end of this time I took an opiate for a few nights, when the fpitting went away, and my pulfe returned to its ordinary ftate.

'After I became convinced that the nitric acid, as a bath, does produce very remarkable effects on the human body, I employed it myfelf in a variety of cafes, and I recommended it to fome other gentlemen, who continued to ufe it. From our experience it appears, that the nitric bath affects fome people more readily than others; nor do I pretend to know the caufe of fuch a difference. Thofe who refift mercury moft, alfo refift the influence of the nitric bath. When the bath is made of a proper ftrength, it irritates the fkin to a degree that cannot be faid to be painful, but which, no doubt, promotes the abforption of the acid. If it be made ftill ftronger, it removes little portions of the cuticle, and from this its effects become ftill more rapid. In order to increafe the abforption of the acid, I have frequently directed people to rub their fkin, for fome time, with a piece of flannel, before entering the bath, or during their continuance in it; and in obftinate cafes I have made them rub the powder of muftard-feed, diluted with water, on particular parts, fo as to produce a flight degree of excoriation, before they bathed. In many, however, it affects the mouth, without any very fenfible action on the fkin.

'I have fometimes made my patients bathe but once a day, remaining in the bath for half an hour at a time; on other occafions I have made them immerfe the whole of the furface below the head, twice

twice a day, and even more frequently. With weakly people I have produced a very ſufficient effect, by immerſing only the legs; and this I have done once a day, or oftener, according to circumſtances. If the legs be kept in the bath for half an hour at a time, and if this be repeated four or five times a day, the effect in general is ſufficiently conſiderable. I have ſometimes made the bath tepid, and ſometimes I have uſed it cold; but I have commonly been deſirous of employing it at a temperature equal to that of the body. If warmer, it produces faintneſs; if cold, it is apt to be followed by pains that reſemble rheumatiſm. The cold bath is never uſed by the natives of India, where religion orders perpetual ablutions, unleſs they are in a ſituation where warm water cannot be procured.

'When the bath is of a proper ſtrength, and when it is employed in the way that I have deſcribed, it will, in general, be found to affect the mouth in about eight or ten days. An improved digeſtion, a remarkable increaſe of appetite, and ſometimes a great flow of urine, follow the uſe of the bath. If it be continued after a conſiderable affection of the mouth, and ptyaliſm, have come on, the pulſe becomes quicker than uſual, and the waſting of the body is ſoon apparent. They are ſenſible of a perpetual taſte of the acid in the mouth; they conſtantly ſmell it, and ſometimes think that their ſaliva has a diſagreeable ſourneſs. A conſiderable degree of weakneſs is now complained of, and an increaſed ſenſibility of the whole ſyſtem. Under theſe circumſtances I have found that opium gives relief, which does not ſeem ſo much the caſe from wine or animal food. I have not obſerved that the diſagreeable ſymptoms, which ariſe from the bath, continue for any length of time after it is given over. With ome people I have uſed the nitric bath once a day; with one even two months, without intermiſſion; while with others I have been obliged to deſiſt in a

few days. I have always employed wooden tubs for the nitric water, and I have heated it at times by plunging tall jars, filled with hot water, into it; at other times, by taking out a part of the bath, and ſupplying the loſs by boiling water, and a proportional quantity of nitric acid.

'I am of opinion that the nitric acid is itſelf abſorbed by the body, not that the ſurface has the power of decompoſing it, and abſorbing either of its component parts.'

Amongſt the diſeaſes frequent in the neighbourhood of Bombay, and which are here noticed, is the puerperal fever, a diſeaſe that very commonly terminates fatally. Mercury is ſtated to be a moſt efficacious remedy in this caſe, uſed ſo as to render the mouth ſore without delay. The author has found the nitric acid ſerviceable in dyſentery, aſcites, and elephantiaſis; in ſcurvy alſo it has been found uſeful, according to the obſervation of other practitioners. Of its effects in ſyphilis he remarks as follows.—'I can have no doubt but that the nitric bath will become a very uſeful agent for the cure of ſyphilis. I believe that many of the failures of the acid in curing lues, have ariſen from too ſmall a quantity of it being in the habit. Although it is certain that it cures ſyphilis without affecting the mouth, yet in general I do not find that the ſymptoms in bad caſes begin to yield till the mouth be conſiderably ſenſible of it. It is deſirable, even in recent caſes, that the affection of the mouth ſhould be apparent, as an index of the quantity of acid that has been abſorbed. We have found that the bath alone removes, very happily, not only the primary, but the ſecondary ſymptoms of lues. In obſtinate caſes the body may be bathed in the acid ſeveral times a-day; on other occaſions it will be ſufficient to keep the legs in it for half an hour at a time, and to repeat this four, five, or ſix times a-day, according to

to circumſtances. I have ſeen chancres, buboes, &c. very readily go away by bathing the lower extremities in this manner, without any application to the parts affected. When the moſt powerful effect is required, the body may be frequently immerſed in the acid bath, of as great a ſtrength as the ſkin can bear it, while it is taken internally in as large a quantity as the ſtomach will permit. By varying the means of abſorption, by giving over the uſe of the acid for a time, and by perſevering for months together, I have certainly ſeen cures produced where mercury had entirely failed, and where I think it never would have ſucceeded. The acid bath, as I ſuppoſe cold water would do in the ſame circumſtances, is apt to produce a kind of rheumatiſm which reſembles venereal pains. I have obſerved that theſe go off in a ſhort time by giving up the uſe of the bath.

"The reſult of our experience of late ſeems to be, that by the bath, or combining the internal uſe of the acid with its external application, we ſucceed in hopeleſs caſes, where mercury has failed; in other inſtances, however, of a ſimilar nature, I have failed by the acid. When the bones are highly diſeaſed, a long time is required to reſtore them to health, even after the poiſon of ſyphilis is neutralized. I think I have obſerved in ſome inſtances, that the immediate relief from pain is not ſo decided from the acid as from mercury, even where its permanently good effects have been far more conſiderable.

'In recent caſes of ſyphilis we have been much more ſucceſsful; I am hardly able in truth to record but very few inſtances of failure. Some caſes have been more troubleſome and more tedious than others, but they have given way in the end.

'With reſpect to the permanency of the cures by the acid, we have reaſon to think that at leaſt they are not leſs ſo than thoſe from mercury; but I

 make

make it a practice in the recent diſeaſe, to affect the mouth by it, or to produce ſome very evident affection of the ſyſtem. I have been blamed for giving too warm a teſtimony of my ſucceſs. I have, however, nothing to detract from the firſt Letter I publiſhed on the ſubject. I have always allowed, that, where mercury has failed, I have too often failed with the acid. I hope that by the aſſiſtance of the bath we ſhall ſtill be more fortunate in future, for it has put us in poſſeſſion of a power that may be much increaſed or diminiſhed, according to the quantity of reſiſtance.'

With reſpect to the *modus agendi* of the acid, the author obſerves, 'that the great law for the cure of moſt of the diſeaſes that have been mentioned, is certainly *oxygenation*:'—in the preſent ſtate of the ſubject, this ſavours too much of hypotheſis to induce us to dwell on it.

The caſes alluded to above, as furniſhed by different practitioners in India, then follow. Above thirty caſes of lues are related by Mr. *Mac Gregor*, in which the acid was ſucceſsfully employed. The medium quantity of acid given internally in the day was an ounce. In two caſes, the enormous quantity of ſixteen drachms by meaſure was given in the day. The bath was of a ſtrength ſufficient to fret the patient's ſkin. The acid uſed was a nearly colourleſs nitric acid, diſtilled from alum and nitre; its ſpecific gravity 1,144. Mr. *M.* obſerves, that the caſes formerly communicated by him remain perfect cures.

Mr. *Hammick*, Jun. in a letter to the editor, obſerves, that nearly twelve hundred patients took under his direction either the nitrous acid, or oxygenated muriat of potaſh, and by theſe remedies the greater number of them were effectually and radically cured; he admits, however, that in ſome of them, theſe medicines ſhewed no antiſyphilitic power whatever. He obſerves, that he has endeavoured to aſcertain the reality of the relapſes ſaid to have happened, as related by Dr. Trotter, but without effect, and concludes,

cludes, therefore, that the Doctor muſt have been miſtaken. He thinks the acid poſſeſſes greater powers as an anti-venereal remedy, than the oxy-muriat of potaſh.

Mr. *Griffith* and Mr. *Macleod* mention a number of inſtances where the nitric acid was efficacious in the removal of ſcurvy; and Mr. *Deane* found it equally ſerviceable in the treatment of dyſentery. No leſs than forty-three caſes of this diſeaſe are particularly detailed, where this remedy was had recourſe to. In the period of three months it was employed in eighty-ſix caſes of dyſentery; the following is given as the reſult,

Cured when the acid alone was uſed	60
Cured by acid, after a long trial by mercury	16
Cured by mercury, after a trial of acid	3
Died when both mercury and acid were uſed	7
	86

Dr. *Rollo*, in a letter to the editor, after giving his teſtimony in favour of the new remedies, obſerves, that he is inclined to think a combination of theſe with mercury, or, which he thinks ſtill better, an alternation of them, will be the moſt effectual and certain mode of cure in obſtinate caſes of the venereal diſeaſe.

With reſpect to the doſe of the nitric acid employed by the Eaſt India practitioners, it is of importance to attend to the remarks of Mr. *Davy* on the ſubject. He obſerves, that the ſpecific gravity of the impure nitrous acids of commerce is rarely above 1,47, or below 1,36. One ounce by weight, therefore, of acid of ſpecific gravity 1,144 (the ſort employed by Mr. *Mac Gregor*) is only equal, with regard to its quantity of real acid, to two drachms of the ſtrongeſt nitrous acid of the ſhops, that is the acid of 1,47, or to little more than three drachms of the weakeſt, i. e. of 1,36.

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There has been now, it is preſumed, enough ſtated, to excite anew the attention of the faculty to the new remedies; and we hope that thoſe who have failed in their attempt to employ them with ſucceſs, will be induced to renew their trials, and, if poſſible, to diſcover the cauſe of the ſtriking difference of reſult between the contending parties. Whichever opinion ſhall ultimately prevail, the unprejudiced, as the editor remarks, muſt be convinced, that acids, by a certain application, produce effects altogether as remote from expectation founded on common experience, as the cure of the venereal complaint by the ſame means.

Art. LXVII. *Practical Obſervations on the Diſeaſes of the Army in Jamaica, as they occurred between the Years* 1792 *and* 1797; *on the Situation, Climate, and Diſeaſes of that Iſland; and on the moſt probable Means of leſſening Mortality among the Troops, and among Europeans in Tropical Climates. By* William Lempriere, *Apothecary to his Majeſty's Forces.* Octavo, 2 vols. pages. Price 13s. London, 1799. Longman and Rees.

THE preſent work, from the known abilities and induſtry of the author, joined to the opportunities for inveſtigation which he poſſeſſed, will form a valuable addition to the numerous treatiſes which have of late been publiſhed, on the intereſting ſubject of the deſtructive malady which has, for ſo many years, prevailed in the Weſt Indies amongſt the Britiſh troops, and newly-arrived Europeans in general. The firſt part of the work gives a general idea of the country, climate, and diſeaſes of Jamaica, as the latter occur from local cauſes, combined with adventitious circumſtances. In the ſecond, the author treats of the particular ſituation of the different military poſts, and the

the influence they poſſeſs on the health of the troops: the ſources of diſeaſe in each are here traced, as ariſing from local cauſes. An accurate knowledge of this ſubject, it is juſtly obſerved, will enable the young practitioner to be prepared for the events he may expect, from the particular ſtation of his regiment, on its firſt arrival in the iſland; to adviſe his commanding officer how to obviate as much as poſſible the inconveniencies attached to that ſituation; and to treat the diſeaſes that may come under his care with that deciſion and confidence, which a previous knowledge of what is to occur will naturally inſpire.

The third part ſhews the effect produced on the health of the troops by a combination of the circumſtances of ſituation, particularity of conſtitution, intemperance, the difference of diſcipline and interior arrangements in each regiment, and the like. In the fourth, the diſeaſes are deſcribed which more frequently prevailed among the Britiſh ſoldiers, during the author's reſidence in the iſland, together with the treatment which he found the moſt ſucceſsful. The laſt part takes into conſideration the duties of a regimental ſurgeon, more particularly in the Weſt Indies; the management of the ſick; and the arrangement of hoſpitals.

Such is the general outline of the work before us. Without attempting to follow the author in detail, which, indeed, conſidering how frequently the ſubject has been before our readers, can hardly be deemed neceſſary, we ſhall confine ourſelves to the notice of a few particulars of the greateſt moment or novelty.

The diſeaſes of tropical climates are well known to be particularly fatal to new-comers from the colder latitudes. After a time theſe become habituated to the climate in ſome degree, and are leſs under the influence of diſeaſe. The period after the arrival of an European, when this aſſimilation is ſuppoſed to be effected, cannot, the author obſerves, with any degree of accuracy be determined, ſince it will vary in

in different conſtitutions. Some have reſided a great many years without experiencing a ſymptom of fever; others have been ſubject to frequent attacks during the firſt ſix months, and afterwards have enjoyed a tolerable ſhare of health; while there are inſtances of people, who, after two years reſidence, upon any extraordinary expoſure to the ſun, or on the changing of the weather, have experienced attacks of fever; and many are obliged to return to Europe, on account of the impoſſibility of their enjoying health in a tropical climate. It may, however, be ſet down as a certain rule, that, in proportion to the length of time Europeans have reſided in the climate, the diſeaſes to which they are expoſed will be leſs formidable; and if, after a reſidence of two years, they are ſtill ſubject to frequent recurrence of fever, they may not expect their conſtitutions will ever be aſſimilated to the climate.

The deſcription of people to whom the climate proves the moſt favourable, are thoſe Europeans who have been ſubject in their native country to ſcrofulous, rheumatic, or pulmonic complaints; to perſons of a ſpare, but not weakly habit; and more particularly thoſe who have paſſed the meridian of life; it being an obſervation founded on experience, that individuals who enjoy good health at the age of forty-five or fifty, in a tropical climate, will probably live to a greater age in the Weſt Indies, than in their native country. This climate ſeems alſo to agree with the conſtitutions of children, who, during the ſtate of infancy, are uſually ſtouter, and are ſubject to fewer diſeaſes, than thoſe of Europe. They are likewiſe obſerved to diſcover earlier marks of comprehenſion and intellect, and have more natural vivacity than children in Europe; but after the age of four, five, or ſix, they fall off in thoſe particulars, become weakly, relaxed, and languid, and acquire the features of conſtitution peculiar to natives of warm climates.

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Amongſt the diſeaſes which may be conſidered as endemical to tropical climates, Tetanus is particularly mentioned: but this affection, the author obſerves, occurs much more frequently among negroes than the white inhabitants. Numerous caſes of it are produced in the former by wounds, or by checked perſpiration, the conſequence of expoſure to the night air, and lying on wet ground. When it aroſe from the former cauſe, he does not recollect a ſingle inſtance of its being treated ſucceſsfully. The latter ſpecies of the diſeaſe ſometimes terminated favourably, by a combination of the uſual modes of treatment adopted for the cure of this diſeaſe, which were often ſo blended with each other, as to render it difficult to decide which plan had the moſt merit in the cure. The *triſmus naſcentium* is in like manner principally confined to the negro children. To what peculiarity in the negro conſtitution this curious fact is attributable, we are entirely ignorant.

The lues venerea, it is obſerved, is not frequent in Jamaica, nor ſo formidable, among the white inhabitants, as in Europe; and ſeems more readily cured by a combination of aperient ſudorifics and mercury, than when the latter is adminiſtered without the former: the gout, rheumatiſm, calculous affections, the true ſcurvy, or what are termed ſcorbutic blotches, though they do ſometimes occur, are neither frequent nor formidable. The true typhus is alſo a rare diſeaſe. Theſe remarks, it ſhould be obſerved, are applicable to the plains and ſea-coaſts only: the mountainous parts ſeem to differ little, either in temperature or diſeaſes, from the more temperate regions of Europe.

A good deal of attention has been beſtowed by the author in pointing out the diſtinction between the tropical continued fever, and the contagious fever, known under the names of *ſhip, jail,* and *hoſpital* fever. He enquires how far tropical climates are favourable to the production and diffuſion of contagion.

'Contagious

' Contagious fevers,' he obſerves, ' in their different varieties, owe their origin to the effluvia ariſing from animal matter in a high ſtate of putrefaction ;* and it has been univerſally allowed, that, in proportion to the concentration of the effluvia, its force will be increaſed, and the variety of the diſeaſe determined: it is alſo generally admitted, that the putrefaction of animal matter is moſt readily induced by a confined, moiſt, and warm atmoſphere.

' Fevers of the typhus kind very unfrequently occur among the white reſidents, people of colour, or negroes of Jamaica ; the latter of whom live in crowded and confined apartments, where their indolence allows filth to accumulate, which they ſhut up with themſelves as cloſe as poſſible, from their deſire to exclude the air, thereby affording every opportunity for human effluvia to become favourable to the generation of contagion ; therefore it muſt be allowed, that the very great heat of this climate is inimical to its generation ; and that if it were generated, the intenſe heat of the day muſt rarify it to ſuch a degree as to render it impotent, and deſtroy its power of propagation. This opinion is ſupported by the unfrequency of typhus among the ſoldiers alſo, unleſs when newly arrived and labouring under the influence of the contagion of ſhip fever ; which even in ſuch caſes does not ſpread, but ſoon diſappears altogether.

' And if the tropical climate be in general unfavourable to the production of contagion, and to its diffuſion or continuance when imported among the ſoldiers from ſhips, the months of June, July, Auguſt, and September, which conſtitute the drieſt and moſt ventilated ſeaſon of the year, (the ſea breezes prevailing with great regularity, purity, and force) muſt be more particularly unfavourable to this production or diffuſion ; beſides, the intenſe heat of theſe months

* This idea, we may obſerve, is hardly accurate. *Contagion* ſeems to have little relation to putrefaction, in the ordinary acceptation of this term, as cognizable by the ſenſe of ſmell.

cauſes

cauſes all the windows and doors of every houſe to be thrown open, with every other means by which air may be admitted, which allows a complete and rapid circulation of dry, warm air; and it was during theſe months that the tropical continued fever prevailed moſt.

'Notwithſtanding the truth of theſe poſitions, it may be admitted, that contagious diſeaſes can exiſt in a tropical climate; but their exiſtence on ſhore muſt be of ſhort duration; for if we compare the ſcheme of mortality, which attends the worſt fevers in tropical climates, we ſhall find it very different to that of contagious fevers in Europe, which depopulate whole towns without diſtinction of perſons; whereas the tropical continued endemic confines itſelf chiefly to newly-arrived Europeans. This obſervation muſt have weight in the concluſions we may draw on the cauſes and nature of the fevers which prove ſo fatal to tropical climates.'

Having given his reaſons for ſuppoſing that tropical climates are not favourable to the generation or diffuſion of contagion, the author next endeavours to prove that the diſeaſe which was ſo fatal in Jamaica did not originate in general from that cauſe. There were, he obſerves, two diſtinct fevers, which proved very fatal to newly-arrived Europeans. The one, extending its influence to thoſe who had reſided a year or more in the country, without having experienced any ſickneſs, or much relaxation from the climate; by acting with more force on perſons of full habits, who lately had arrived from Europe, eſpecially thoſe between the age of ſixteen and forty; on men more than women; and on thoſe even more than on children, or on perſons who had paſſed their fiftieth year, and to which Europeans have ever been ſubject on their firſt arrival in the Weſt Indies. This diſeaſe ariſes from the action of very powerful marſh miaſma on conſtitutions not aſſimilated to the climate; which is aided by the prediſpoſing cauſes of the intenſe heat

that

that prevails during the hot months moſt productive of this form of fever, by intemperance, and by expoſure to the ſun: theſe circumſtances combined, produce the tropical continued fever.

The other was the common typhus fever, produced by cauſes exiſting in the ſhips, or derived by them from places where it already exiſted; having invariably ſhewn itſelf before the veſſels arrived at a tropical port, where it then in ſome degree changed its form, and acquired ſome of the ſymptoms of the tropical endemic, gradually loſing its contagious property; the force of which ſeemed to be diminiſhed by the climate, as its influence did not extend, but in very few inſtances, beyond the original ſource of the diſeaſe; and in no inſtance did it extend to ſituations out of the direct and conſtant line of communication with the ſhipping; except in that of the *Iriſh brigade*, who probably carried the fomites in their clothing, to deſtroy which, or ſtop the progreſs of the diſeaſe in any way, but very inadequate means had been adopted.

Perſons of every deſcription, of every age and ſex, lately from among the ſhipping and from Europe, were ſubject to this diſeaſe; which proved more rapidly mortal than the former. The tropical continued fever is characterized by a combination of the following ſymptoms, which are not found in the typhus, or fever ariſing from contagion: viz. the black vomit, dark ſtools and urine, with a univerſal yellowneſs, and that particular clay-like, gloomy, ghaſtly countenance, which is never obſerved along with the other ſymptoms enumerated in any other diſeaſe. This is not conſidered by the author by any means as a new diſeaſe, but as generally continuing, with more or leſs violence, between the tropics, though it has been more frequent and fatal within the laſt five or ſix years, than at any former period. This unuſual prevalence of late, muſt be referred, he thinks, to that particular but unknown conſtitution of the atmoſphere, upon

upon which the exiſtence of endemics at one period rather than another depends.

With reſpect to the treatment of this fever, blood-letting is ſtrongly objected to, after the diſeaſe is fully formed: but as a preventative, and at the firſt moment of the attack, this evacuation is as ſtrongly adviſed. To procure a number of copious ſtools within a few hours of the firſt attack, by calomel and other active purgatives, and by enemas, is conſidered as one of the moſt important parts of the cure; 'and as the 'conſtipation of the bowels proceeds from ſpaſm 'which has now become very general, it is adviſable 'both from reaſon and our experience to immerſe the 'whole body in a warm bath, and keep it there, as 'long as the patient can remain without inducing 'ſyncope.'—This part of the practice, we may remark, is ſomewhat new; we confeſs we have more reliance on the author's *experience* of its utility, than on any evidence deduced from *reaſon*, with reſpect to its antiſpaſmodic powers. Emetics and bliſters are condemned in general terms.

If conſiderable relief be not afforded in the courſe of the firſt twenty-four hours, congeſtions in the abdominal viſcera and in the brain may be conſidered to have formed, to remove which muſt be the grand object in view. The remedy chiefly relied on for this purpoſe is mercury: but as it was found that calomel was frequently exhibited in immenſe quantities, without exerting any apparent action, owing probably to the torpid ſtate of the abſorbent veſſels, the author was induced to employ the ſublimate. About the eighth part of a grain of this ſalt was given in ſolution, along with ten drops of laudanum, every hour, until ſome affection of the mouth was obſerved, or the more alarming ſymptoms were conſiderably abated; when it was adminiſtered at more diſtant intervals, or omitted altogether. The tincture of opium, combined with the mercury, did not appear to affect the

 head,

head, even when given in very large doſes. Mercury exhibited in this mode was given to fourteen patients labouring under the tropical continued fever, two only of which died, and theſe had been ill two or three days before it was adminiſtered. The typhus, or contagious fever, the author obſerves, required much the ſame general treatment, with a freer uſe of ſtimulants, and a nutritious diet.

ART. LXVIII. *Phyſiologie Vegetale, contenant une Deſcription des Organes des Plantes, &c.* i.e. *Vegetable Phyſiology; containing a Deſcription of the Organs of Plants, and an Expoſition of the Phenomena produced by their Organization. By* J. SENEBIER. Octavo, 5 vols. *Geneva,* 1800.

THE claſſification of vegetables, their deſcription, and nomenclature, have engaged the attention of philoſophers for a long ſeries of ages: but their organization and actions have been little noticed, till within the laſt half-century. In this period, a great variety of curious facts have been detected by the different naturaliſts engaged in the ſubject, and no one has more diſtinguiſhed himſelf than the author of the work here noticed. To him we are chiefly indebted for the diſcovery of the effects exerted by *Light* on vegetation, as well as of various other important circumſtances. The preſent work may juſtly be conſidered as a complete ſyſtem of vegetable phyſiology, embracing the whole maſs of ſcience on this intereſting topic.

The author commences with the anatomical ſtructure of plants, and their various organs; deſcribing, firſt, thoſe elementary parts that are common to the greater part of vegetables; as their fibres, veſſels, utricules, and tracheæ. Thence he procee to the deſcription of the organic parts common to the generality,

rality, and which are made up of the preceding more ſimple parts; as the bark, the wood, &c. He next conſiders the organs which are eſſential to the life or health of plants; as the roots, branches, leaves, &c. Laſtly, he explains their organs of reproduction; as flowers, fruit, and ſeeds.

This hiſtory is terminated by an account of the various fluids furniſhed by plants in the healthy ſtate, as alſo of certain ſolid matters thus produced; as the lymph, oils, different gaſes, gums, fecula, and the like.

Having gone through the anatomical part of his work, the phyſiology or functions next engage the author's attention. Reflecting on the great influence exerted by external agents on vegetables, he inquires particularly into this part of his ſubject, treating in ſucceſſion of ſoils, manures, water, rain, dews, ſtorms, air, light, heat, and electricity, with relation to their effects on the life of vegetables. The ſtudy of this relation is a matter of the firſt importance, and conſtitutes, in fact, almoſt the whole art of the agriculturiſt. When we reflect, too, that all theſe elements act ſeparately or together on plants, during every inſtant of their exiſtence, the ſubject will be admitted to be one of the moſt complicated that can be offered to the meditation of man.

Having conſidered vegetables in relation to the bodies which ſerve them for food, the author conſiders them in themſelves: he here treats of their evolution and growth, and the general effects which accompany theſe; as the budding, the direction of the ſtems, roots, &c., together with the production and fall of the leaf, the ſleep of plants, and their mode of generation and increaſe; and, finally, he traces them to their decline and death.

Subſequently to this hiſtory of vegetation, the author examines the general properties attributed to plants; as irritability, ſpontaneous movement, and ſenſibility. He has proved, he thinks, the non-exiſt-

ence of the two latter qualities, and endeavours to ſhew that the irritability of plants is not ſo ſatisfactorily eſtabliſhed as is commonly believed, but that we are deceived by the ſuppoſed analogy of plants with animals. M. *Senebier* points out the danger of puſhing analogy too far, ſhewing in how many reſpects it is defective, and how many erroneous ideas have been introduced into the ſtudy of plants, by the continual compariſon which has been made of them with animals. Thus, for example, the wood has been compared with the bones of animals; but the wood is formed by the developement or change of the surrounding bark, whilſt bone is produced without taking any thing from the ſurrounding fleſh: the wood grows continually, and preſerves its diameter; whilſt, on the contrary, a bone ceaſes to grow, and even diminiſhes as old age advances: a wound in the wood of a tree is incurable, but a broken bone becomes again conſolidated: wood is made up of the union of the veſſels of nutrition of the plant; bone receives its nouriſhment from the ſurrounding parts: bone, in fine, is provided with muſcles, but wood has no ſuch appendage.

The fluids of plants have, in like manner, been compared with thoſe of animals, as well as the veſſels which contain them. But the analogy, the author remarks, is very imperfect; for it is not proved whether the ſap-veſſels, as they are called, are really hollow tubes, and not merely ſolid fibres. This compariſon the author carries to much greater length, endeavouring to ſhew that ſuppoſed and imperfect analogies have led us into numerous and important errors.

M. *Senebier* terminates his work by pointing out to future inquirers, under the title of *deſideranda*, thoſe points on which he conceives our knowledge is principally deficient, and the inveſtigation of which promiſes to conduct to highly important reſults.

Eſprit. des Journaux, tom. 30-ieme.

ART.

ART. LXIX. *A Treatiſe on Ophthalmy, and thoſe Diſeaſes which are induced by Inflammations of the Eyes; with new Methods of Cure.* By EDWARD MOORE NOBLE, *Surgeon.* Part the Firſt. Octavo, 144 pages. Price 4s. London, 1800. ROBINSONS.

THE author in his preface, obſerves that he has devoted himſelf for ſeveral years chiefly to that branch of the profeſſion which makes the ſubject of the preſent eſſay; he hopes, therefore, to be able to contribute ſomewhat to the improvement of this part of the healing art. A ſufficient proof, indeed, is here afforded of his having beſtowed no ſmall ſhare of attention on this important claſs of diſorders. 'The art of curing diſeaſes,' he remarks, 'has, of late years, made rapid ſtrides towards arriving at that *acme* of perfection, [*qu?*] beyond which it is not in the power of man to advance it. The light which has been let in upon us, by the doctrines of that great genius, Dr. *John Brown*, and ſo ably ſeconded by a *Darwin*, and a *Beddoes*, has laid the foundation of a new æra in the annals of medicine, and has opened new views to the practitioner, in the theory and treatment of diſeaſes.

'Since that epoch, no regular treatiſe on the inflammation of the eye has appeared, in which the mode of treatment has been founded on ſyſtematic principles; and when we conſider the importance and delicacy of that organ, we ſhall be ſurpriſed to find how little has been done towards arriving at a rational plan of cure.

'The regular routine of bleeding, bliſters, and cathartics, with a variety of external applications, are generally indiſcriminately applied, with little attention to the nature or the period of the diſeaſe; and there are ſome practitioners who act with ſtill greater inconſiſtency, and maintain, that it is uſeleſs to inſpect the eye; that it cauſes an unneceſſary degree of irritation; and that we ought to truſt entirely to internal medicines.'

The general hiſtory of ophthalmy occupies the firſt ſection, and is given with much accuracy. When treating on the cauſes of the diſeaſe, the author enters largely into the conſideration of the laws of irritability and animal motion, for the purpoſe of elucidating the doctrine of inflammation in general. On this head he follows the moſt approved writers of the preſent day; in his application of them to the ſubject in queſtion, he has, for the moſt part, the merit of originality; for it can ſcarcely be denied, that diſeaſes of the organs of ſight have been hitherto treated in a way little better than empirical.

The author next ſtates, in a general way, the cauſes of *ophthalmy*, as follows: inflammations of the eyes, he obſerves, may be cauſed either by an increaſe of the uſual *ſtimuli*, or of a new one ſuperadded; or, by an increaſe or accumulation of the irritable principle.

Firſt. Inflammation may be excited by any thing which can ſtimulate the veſſels of the eye into actions greater than natural; as,

A. By violence done to the eye by mechanical means, which ſeem to produce their effect from the form and ſolidity of the particles deſtroying the continuity of the part, or from its motion being impeded; as, blows or wounds in the eye; warts, or encyſted tumours, on the lids; an inverſion of the ciliary edge of the eye lids; or by foreign bodies inſerted between the lids and the globe.

B. By ſtimulant and acrid ſubſtances.

C. By thoſe things which affect the eye, as an organ of ſenſe.

D. By any thing that will increaſe the action of the lachrymal gland, which, by cauſing a more copious ſecretion of tears, will add to the irritation, and particularly if they are confined, as in the meaſles, ſmall-pox, &c.

E. By the action of the veſſels in the vicinity being increaſed, as by eryſipelatous and various inflammatory

matory affections of the face; and wounds or burns of the ſame part.

Second. By a *ſtimulus* leſs than natural, as cold; as by going from a warm room into cold air.

He then proceeds to ſpeak of each of theſe in detail. The following obſervations on the burſting of the capſule of the cryſtalline lens, and the forcing the body of the lens, through the iris, into the anterior chamber of the eye, in conſequence of a blow on this part, are curious, and ſerve to ſhew that the cryſtalline lens is not eaſily abſorbed when deprived of its capſule; and that it may remain in the eye, as an extraneous ſubſtance, for many years, without cauſing much irritation.

'About five years ſince, a man was brought to me, who was ſtruck on the eye with a piece of ſteel, that flew off the tool he was hammering. On inſpection, I found on the outer ſide of the eye, about mid-way between the circumference of the *cornea* and the outer angle, a ſmall extravaſation of blood on the *tunica conjunctiva,* which in other reſpects appeared to be a good deal injured by the blow; and the cryſtalline lens was ſeen about half protruded through the aperture in the iris, into the anterior chamber of the aqueous humour: the *iris* alſo in one part was ſlightly lacerated. On the next day, the whole of the lens was diſcovered to be in the anterior chamber, and which became opaque three days after the accident. He recovered from the ſubſequent inflammation, as ſoon as could be reaſonably expected; and though it is five years ſince, the ſize of the lens is not apparently diminiſhed, and in that time, he has only had one attack of inflammation, ſo violent as to prevent him from attending to his uſual employ, though it is frequently ſlightly red and irritable.

'A few weeks ſince, alſo, a man wiſhed my advice for an inflammation, attended with a good

deal of pain, which he had in one eye. On examining the eye, I ſaw, to my ſurpriſe, that the cryſtalline lens, which appeared of the natural ſize, occupied almoſt the whole of the anterior chamber, yet not ſo much ſo, but that the *iris* could be perceived to have preſerved its proper figure; and, looking at the eye in one direction, I thought I could perceive an opacity of the capſule of the lens. On my inquiring into the hiſtory of his complaint, he told me, that more than *twenty-two* years ago, as he was digging in a ditch, a twig ſtruck him with conſiderable force on the eye; that he could ſee a little after the accident, but that by the next day the eye became very painful and ſwelled, and that on the inflammation ſubſiding he found he had totally loſt the ſight of the eye. In a few weeks the eye became free from pain, and from that time to this laſt attack, which he attributes to cold, and which is a period of twenty-two years, he says, it has never prevented him from attending to buſineſs, though he recollected, on my queſtioning him, that two or three times the eye had been ſlightly red and troubleſome for a few days.'

With reſpect to the cure of ophthalmy, this is only ſo far treated of, in the preſent part, as regards the removal of the remote and exciting cauſes enumerated. In the ſecond part, which is promiſed ſhortly to be laid before the public, the treatment of inflammation of the eye, generally, will be reſumed, and endeavoured to be eſtabliſhed on this law of the animal œconomy: viz. ' that a *ſtimulus* ſtronger than uſual being applied to the moving fibre, makes it leſs eaſily excited into action; and that on the ſudden ſubtraction of this increaſed *ſtimulus,* the motions of the part will be diminiſhed.' The principal object in practice, Mr. *Noble* obſerves, will be, the application of a *ſtimulus,* in a peculiar manner, as

as great as the eye can bear, without being thrown into convulsive motions, and when this stimulus loses its effect of causing pain, to suddenly remove it, and diminish all *stimuli*, or irritating causes, as much as possible. By these means, he says, a diminished action of the vessels will be induced, the pain will be moderated, and an alleviation of the symptoms will take place.

ART. LXX. *The Physicians' Portable Library, or Compendium of the Modern Practice of Physic, in which the Causes, Symptoms, and Treatment, of all the Diseases incident to the Human Body are clearly and fully Delivered; together with the Virtues, Doses, and proper Exhibition of all the Medicinal Simples and Compositions directed in the last London and Edinburgh, Pharmacopœias. To which are added Tables of the new Names adopted by each College, and of their reference to those formerly in use. By* BRABAZON SMITH, *M. D.* Twelves, 256 pages. Price 5s. London, 1800. MATHEWS.

THE utility of compendious works of the description of the one before us, for the purposes of occasional reference, and as aids to recollection, is too obvious to be disputed; beyond this, they have certainly no pretensions. It is sufficient that they are drawn up with accuracy, and judgment in the selection of the leading and important points, to the exclusion of matters of inferior moment. We agree with the author in thinking the alphabetical order best adapted for a manual. Classical arrangement would, indeed, be useless, if not impracticable, in a breviary of this sort. Immediate reference to subjects can in no way so readily be made, as by means of alphabetical arrangements. A few short

ſhort extracts will enable our readers to form an opinion of the execution of the preſent undertaking.

'ARNICA, *herba, flos, radix.* (L. E.)—Stimulant, diaphoretic, antiſpaſmodic, recommended in paralytic caſes, a dram to half an ounce of the flowers infuſed in boiling water, and taken in the courſe of the day. In powder, five grains to a ſcruple at each doſe; ſmall doſes, however, frequently repeated, and gradually increaſed, ſhould always be preferred.

'CARDAMINE. *Flos.* (L. E.)—Diuretic, diaphoretic, antiſpaſmodic; one or two drams of the powder, two or three times daily;—adviſed in epilepſy, chorea, aſthma, hyſteria, &c.

'DULCAMARA, *ſtipites.* (E.) Diaphoretic, diuretic, diſcutient, narcotic; of an infuſion made with half an ounce of the dry ſtalks in a pound of boiling water, one or two ounces may be taken twice or thrice a day; in herpetic eruptions, rheumatiſm, jaundice, and obſtructed menſtruation; the doſe ſhould be ſmall at firſt.

'HERPES.—Numerous ſmall ulcers gathering in cluſters, and ſpreading on different parts of the ſkin. The diſorder has received ſeveral appellations, according to ſome variety in the ſymptoms, or the part it attacks, as *Herpes Farinoſus*, appearing commonly on the face, neck, arms, and wriſts, and at length falling off in a white powder: *Herpes Puſtuloſus*, breaking out in diſtinct puſtules, filled with a yellowiſh fluid, which running together dry into a thick ſcab: *Herpes Miliaris*, occurring more frequently in cluſters or circles about the loins, breaſts, perineum, and ſcrotum: *Herpes Exedens*, appearing at firſt as ſeveral ſmall ulcerations collected into larger ſpots of different ſizes and figures, diſcharging a conſiderable quantity of acrid matter that corrodes the ſkin, and ſometimes even the cellular texture. Give mercurial or antimonial alteratives.

'POUL-

'POULTICE, *carbonic.*—Applied in gangrene, ſphacelus, cancer, and putrid ulcers. It is prepared by adding to oatmeal and water, boiled together, as much powdered charcoal as will make it of a ſomewhat firm conſiſtence: a ſmall quantity of yeaſt may be occaſionally ſpread over its ſurface.'

We obſerve the author has taken no notice of the new remedies or doctrines that have been introduced of late; nor, perhaps, was it proper ſo to do in a work of this nature.

ART. LXXI. *Traité ſur la Maniere d'elever Sainement les Enfans, fondé ſur les Principes de la Medecine et de la Phyſique, &c. A Treatiſe on the Method of bringing up Children healthy, founded on the Principles of Medicine and Philoſophy, and deſtined to the Uſe of Parents, particularly to Mothers, who have their own Health and that of their Children at heart. By* J. P. FRANK, *Clinical Profeſſor at Vienna, &c. &c.* Octavo, 142 pages. Price 3s. 6d. Imported by BOOSEY. London, 1800.

THE work before us is a tranſlation into French from the German language. The high and deſerved reputation of the author cannot fail to give it much intereſt with the profeſſional reader. The ſubject is one no leſs difficult than it is important; for the diagnoſis and pathology of infantile diſeaſes reſt on ſo uncertain a baſis, that our art in this reſpect is little better than conjecture; and we are compelled to truſt almoſt wholly to the dictates of experience, and that the moſt fallible and uncertain.

M. *Frank* treats of Infancy and its diſeaſes, from the period of birth to the termination of the firſt years of childhood. The nature and extent of the work will appear from the following ſummary of its contents, which we have ſelected with this view.

Of

Of the number of infants which perish in the birth, and shortly after, with an inquiry into the causes of this mortality:—Of the impression of heat and cold on the bodies of new-born infants, of the obstacles to respiration, and the means of obviating them:—Inspection of the bodies of infants, detection of accidents, and means of remedying them:—First objects of attention after birth, as tying the umbilical cord, and cleansing of the skin:—Nourishment of the infant; milk, properties of at first, and proper time of administering:—Of suckling, consequences to the mother of neglecting it:—Comparison of an infant deprived of the milk of its mother, to a plant transported to a foreign soil:—Acquirement of diseases, both moral and physical, by suckling:—Influence of the manners and temperament of the nurse on the character and constitution of the child:—Cases in which weaning must necessarily take place, and the substitution of the milk of domestic animals, and choice of the animal:—Of the greater or less abundance of milk in the mother:—Characteristics of good milk:—Influence of foods and drinks on its quality:—Proper time of weaning, with the evils arising from too long suckling:—Aliment of children after weaning:—Animal food:—Drinks:—Sugar, use of as an article of diet:—Sleep and watching of infants:—Impropriety of suffering them to sleep with old people:—Advantages and inconveniencies of the cradle:—Evils which result from improper methods of carrying children:—Of the swaddling of infants:—Effects of compression on the lungs, stomach, and head:—Effects of corsets and bandages of different kinds:—Of air.

From this the reader will perceive that there are few subjects, of any moment, connected with the state of infancy, which the author has overlooked: and we may add, that he has treated the whole with much perspicuity and judgment.

ART.

ART. LXXII. *A Familiar Treatiſe on the Education of Children, during the early Period of their Lives. Being a Compendium addreſſed to all Mothers who are ſeriouſly concerned for the Welfare of their Offspring. Tranſlated from the German of* CHRISTIAN AUGUSTUS STRUVE, *M. D. Phyſician at* Görlitz *in* Saxony, *&c. To which are prefixed, Three introductory Lectures on the ſame Subject: by* A. F. M. WILLICH, *M. D.* Octavo, 450 pages. Price 8s. London, 1801. MURRAY and HIGHLEY.

THE Treatiſe before us ſeems well calculated to obviate a number of thoſe prejudices and erroneous notions which very generally prevail with regard to the management of infants, and which are no doubt extremely injurious to both their moral and phyſical conſtitutions. The author enters, with a minuteneſs bordering on tedioufneſs, into the conſideration of the concerns of the nurſery, by the ſuperintendants of which the preſent Treatiſe may be conſulted with advantage.

The introductory lectures of the tranſlator tend to the ſame uſeful purpoſe, and are no leſs minute than the work itſelf, on the ſubjects of which they treat. The remarks on the utility and advantage of *crying* in infants, will perhaps excite a ſmile in the reader. This ſort of exclamation, the tranſlator obſerves, 'ſeldom originates from pain or uncomfortable ſenſation; but is rather to be conſidered as an effort or manifeſtation of power: in moſt inſtances, theſe vociferating ſounds imply the effort which children neceſſarily make to diſplay the ſtrength of their lungs, and exerciſe the organs of reſpiration: they tend, likewiſe, to diſſipate the ſtagnant air in the abdominal region, and to remove accumulations of viſcid matter, or congeſtions of blood in the pulmonary veſſels:—there is no better remedy to promote a due and uniform circulation, than theſe efforts of nature.'

ART.

Art. LXXIII. *A Brief Hiftory of Epidemic and Peftilential Difeafes; with the principal Phenomena of the Phyfical World which precede and accompany them, and Obfervations deduced from the Facts ftated. By* Noah Webster. 2 vols. Octavo, 700 pages. Hartford, N. A. 1799.

THE fubject of the work above announced is one that at all times is calculated to excite much general attention; at the prefent period, when a large portion of the globe has been feverely vifited by peftilence, or epidemics which deferve the name, it is peculiarly interefting. The Hiftory of the fubject here given has been moft favourably received in America, and the account of it we are now to furnifh our readers with, is extracted from a valuable periodical work, the *Medical Repofitory*, publifhed at New York, by Drs. *Mitchill* and *Miller*, two phyficians of high character in that city; the former of whom has beftowed uncommon pains in inveftigating the fource of the malady, which has of late proved fo deftructive in various places on the American continent. The collection of facts, as well as the confultation of authorities by the author of the prefent Hiftory, is eminently great. The refult of his inquiries tends ftrongly, in his opinion, and that of his American reviewers, to overturn the prevailing doctrine of the importation of contagion from without, and to eftablifh the origin of peftilential difeafes in general, as depending on fome peculiar and occult ftate of the atmofphere, more or lefs widely diffufed.

To contemplate peftilential difeafes with more advantage, and to compare and digeft their phenomena, as they occur in diftant countries and remote ages, Mr. *W*. affumes the ftation of an hiftorian, and caufes to pafs before him, in review, a long feries of thofe difeafes, with a train of occurrences in the phyfical world accompanying or preceding them, in order

that

that they may mutually lend their aid in explaining and illuſtrating each other. It is aſtoniſhing to reflect that this is the firſt attempt to write a hiſtory of epidemic and peſtilential diſtempers. To compoſe ſuch a work in the beſt manner, it is neceſſary to collect, and to bring under proper points of view, the facts which lie diſperſed through innumerable volumes; to read the writers of each age and nation in the original; to enter into the circumſtances of the times when they wrote; to examine the ſtate of ſociety, the diet, clothing, habitations, cuſtoms, manners, &c., of the people, as well as to aſcertain the nature of the ſoil, the face of the country, and the climate wherein they occur. A great deal of this has been accompliſhed by our author; but much of it can never be attempted, from the want of materials, owing to the defect of hiſtorical records, to the ravages of time, or to the devaſtation of barbarians.

The leading object of this work is to prove that epidemic and peſtilential diſtempers originate from a deleterious agent or agents, operating through the medium of the atmoſphere, ſometimes locally, and ſometimes over the whole globe, diſappearing and returning at unequal periods. This is preciſely the *epidemic conſtitution* of *Sydenham*, of which the facts collected by Mr. *W*. exhibit a luminous and incontrovertible proof.

One of the moſt intereſting features of this hiſtory is the relation ſuppoſed to ſubſiſt between peſtilential epidemics and ſundry other phenomena of the phyſical world; ſuch as comets, volcanic eruptions, earthquakes, meteors, the extreme of heat and cold, exceſſive rains and drought, tempeſts, high tides, inundations, unuſual numbers of inſects, failure of crops, famine, &c.

In the firſt ſection of theſe volumes Mr. *W*. treats of the diverſity of opinions reſpecting the cauſe and origin of peſtilence. He contraſts the opinions of the ancients, formed from perſonal and unbiaſſed obſervations,

vations, with those of some modern writers, particularly Dr. *Mead*, who finds in specific contagion, imported from *Egypt* or *Ethiopia*, a cause powerful enough to kindle the plague, and to ravage whole continents.

Having examined the opinions of the ancients respecting epidemical constitutions of the air, a subject that engaged a good deal the attention of our *Sydenham*, the author, in the subsequent sections, delivers an historical view of pestilential epidemics, and the phenomena in the physical world, which accompany, precede, or follow them, from the earliest records to the Christian era—from the Christian era to the year 1347—from the year 1347 to 1500—from 1500 to 1600—from 1600 to the close of the year 1700—from the year 1701 to the year 1788—and from the year 1788 to the year 1799, including the last epidemic period.

The second volume is introduced with *bills of mortality* for the two last centuries, with an account of the principal cotemporary phenomena of the elements. These bills are for *London*, *Augsburg*, *Dresden*, *Boston*, one religious society in *Philadelphia*, with a few of *Paris* and *Dublin*. After these, the author delivers some general remarks on the preceding history, and the bills of mortality; and as those remarks exhibit an outline of the historical facts, and of the principles deduced from them, and, at the same time, afford a specimen of the author's style and manner, we lay them before our readers. (*Sect.* 10, p. 10.)

"Imperfect as ancient history is, in regard to the accounts of diseases, and the extraordinary phenomena of nature, we find that between the year B. C. 480 and the Christian era, a number of violent plagues occurred; most of which coincided in time with the following phenomena: comets, eruptions of volcanoes, earthquakes, drouth, severe winters, diseases among cattle. Of thirteen comets mentioned in the foregoing

going hiſtory, *eight* of them coincide with volcanic eruptions of Etna, the only volcano of any note which the hiſtory of that period has recorded; and *eleven* of them coincide in time with peſtilence. If we conſider the ſcarcity of our materials for a hiſtory of theſe phenomena, at that period, and make allowances for the uncertainty of chronology, we find reaſon to be ſurpriſed at ſuch a number of theſe coincidences. In ſeveral inſtances we find extreme drought, and very ſevere winters, to correſpond in time with comets and eruptions of Etna, conformable to facts in modern days.

" On this ſubject hiſtory is barren alſo for many centuries after the Chriſtian era. Yet in every period, even in the dark ages, we find numerous coincidences of the great phenomena above-mentioned. All the great plagues that have afflicted mankind, have been accompanied with violent agitations of the elements.*

" This obſervation reſts particularly on the events that preceded and attended the peſtilence of the following periods: A. D. 80, 167, 252, 375, 400, 445, 542, 558, 590, 639, 679, 682, 745, 762, 802, 905, 994, 1005, 1031, 1044, 1069, 1106, 1135, 1142, 1162, 1181, 1222, 1242, 1300, 1347, 1368, 1400, 1477, 1500, 1531, 1577, 1602, 1625, 1636, 1665, 1699, 1709, 1719, 1728, 1743, 1751, 1760, 1770, 1783, 1789. Many facts, in other periods, occur to prove the truth of the remark.

* " Modern philoſophy objects to the popular ſenſe in which the word *elements* is uſed; ſince it appears that what has uſually been conſidered as an *element*, is found by modern chemiſtry to be a compound ſubſtance, reſolvable into parts, in their natures and properties, diſtinct. Notwithſtanding theſe diſcoveries, I cannot conſent to diſcard the popular uſe of the word *element*. Nature preſents to the ſenſes of man, fire, earth, air, and water, in a particular and predominant form. This is the form in which they appear to be moſt uſeful to man, and to be the conſtituent materials of other ſubſtances, as well as the agents in carrying on the great viſible operations of the ſyſtem. I therefore conſider the popular diſtribution as natural and convenient."

"The phenomenon moſt generally and cloſely connected with peſtilence is an earthquake. From all the facts that I can find in hiſtory, I queſtion whether an inſtance of a conſiderable plague, in any country, can be mentioned, which has not been immediately preceded or accompanied with convulſions of the earth. If any exceptions have occurred, they have eſcaped my reſearches. It does not happen that *every place* where peſtilence prevails is ſhaken; but during the progreſs of the diſeaſes which I denominate *peſtilence*, and which run, in certain periods, over large portions of the globe, ſome parts of the earth, and eſpecially thoſe which abound moſt with ſubterranean fire, are violently agitated.

"By adverting to the foregoing hiſtory, the reader will find that all thoſe years in which conſiderable earthquakes have happened in America have been remarkably ſickly. Theſe years are 1638, 1647, 1658, 1662-3, 1668, 1727, 1755, 1783: ſee the hiſtory and the bills of mortality. Even the ſlighter ſhocks have been attended with a conſiderable ſickneſs, or have introduced a ſeries of epidemics, being cotemporary with the meaſles, influenza, or ſore throat, as in 1669, 1720, 1737, 1757, 1761, 1769, 1771, 1791, 1797.

"To enumerate the inſtances in Europe and Aſia, would be a uſeleſs repetition of the events related in the preceding hiſtory, to which the reader is referred.

"Another phenomenon, which, next to earthquakes, appears to be moſt cloſely connected with epidemic diſeaſes, is the eruption of fire from volcanic mountains. In this article hiſtory is deficient, or I have not been fortunate enough to find the works neceſſary to furniſh a complete view of theſe phenomena. There are whole centuries in which the books I have conſulted mention no eruption of Etna and Veſuvius. The account of eruptions in Iceland, from

from the year 1000, taken from *Pennant*'s Zoology, vol. 1, p. 331, is probably complete, or nearly ſo. Of the volcanoes in the Andes we have very few accounts, as well as of thoſe in the Moluccas. Of thoſe in the arctic regions of Aſia and America we know very little.

" Notwithſtanding theſe defects, we are able, by the eruptions in Italy, Sicily, and Iceland, to arrive at ſome very important concluſions. The reader muſt have noticed, in the preceding hiſtory, the coincidences in time between volcanic diſcharges and winters of unuſual ſeverity. The diſcharges either precede or follow the winter.—Thus the eruptions of 1766, 1779, 1783, were immediately followed by intenſely cold winters. The ſevere winters of 1762-3, and 1779-80, were ſpeedily followed by eruptions. Theſe inſtances will ſerve as ſamples of the ordinary courſe of theſe events. Sometimes the eruptions continue, or are repeated for a number of years in ſucceſſion; but the eruptions, when continued, are moderate, and the ſeaſons variable. When the volcanoes have been for ſome years quiet, and the ſuſpenſion is followed by a great diſcharge, it appears to me that ſevere winters invariably follow or precede the diſcharge, within a few months. So alſo, when an eruption is continued for a number of years, if at any time the diſcharge becomes violent, a ſevere winter attends it, as in 1669: Etna was in a ſtate of eruption from 1664 to 1679; but in 1669 the diſcharge was immenſely augmented, and the winters next preceding were very ſevere.

" There are ſome years in which eruptions are noted, of which I find no account reſpecting the ſeaſons. Perhaps ſome of theſe will, on further inveſtigation, be found to be exceptions.

" It is to be obſerved, that, in ſome caſes, a ſevere winter extends to both hemiſpheres, ſometimes to

 one

one only, and, in a few cafes, to a part of a hemifphere only. Thus in 1607-8—1683-4—1762-3—1766-7—1779-80—1783-4, the feverity extended to both hemifpheres. In 1640-41—1739-40, and in other inftances, the fevere winter in Europe preceded, by one year, a fimilar winter in America. In a few inftances fevere froft takes place in one hemifphere during a feries of mild winters in the other; but this is lefs common. In general the feverity happens in both hemifpheres at once, or in two winters in immediate fucceffion; and, as far as evidence has yet appeared, this feverity is clofely attendant on volcanic difcharges, with very few exceptions.

"Another phenomenon which ufually coincides in time with fevere winters, is the approach of comets. I have been ftruck with furprize at the coincidences of this kind. There are a few inftances on record of mild winters during the appearances of thefe bodies; but in thefe cafes the comets have appeared to be fmall, or to pafs the fyftem at an immenfe diftance from the earth. The large comets, and thofe which approach near to the earth, *feem* to produce, almoft uniformly, great heat, exceffive drought, followed by very cold winters, tremendous ftorms of wind, rain, hail, and fnow; unufual tides, or fwell of the ocean; and, ufually, volcanic eruptions. How far thefe phenomena are connected, as caufe and effect, future obfervations may determine. Some of them occur fo uniformly in the fame year, that I cannot refift the evidence of their connection.

"After a volcano has been many years quiet, its difcharges are, I believe, always preceded by extreme drought; and this defect of water is not only obfervable in the vicinity of the volcano, but often extends over a whole continent, if not over the world. Many inftances have been related: it is

is ſufficient here to mention the exceſſive drought in 1762 and 1782, preceding eruptions of Etna and Heckla. In theſe years almoſt all ſprings were exhauſted over a great portion of America.

"Cold winters ſometimes follow wet ſeaſons, but, more generally, a very hot ſummer, or very dry autumn. Sometimes two or three ſevere winters occur in ſucceſſion, as in 1766, 1767, and 1768; and in America from 1796 to 1799.

"The years when comets approach, or volcanoes diſcharge fire, and when the atmoſphere exhibits fiery appearances, as meteors, ſtreams of light, and mock ſuns, are beyond compariſon the moſt tempeſtuous: witneſs the years 1766, 1771, and 1772; 1780, 1783, 1784 and 1785; 1788, 1797. In ſuch years the riſk on veſſels at ſea is greatly increaſed.

"As dry ſeaſons uſually precede volcanic eruptions, ſo very wet ſeaſons often follow them. This ſeems not to be the invariable courſe of events; but there are remarkable inſtances of deluging rains after theſe diſcharges: witneſs the ſeaſons following the univerſal convulſions of the earth in 1692 and 1693, and 1766. Thus the electricity is reconducted to the earth.

"In every caſe, I believe, this remark will be found true; that the approach of comets, and volcanic eruptions, diſturb the regular courſe of the ſeaſons. The heat of ſummer and the cold of winter are in extremes; more ſnow is generated in winter, and more hail in ſummer; tempeſts are more violent and frequent, meteors more numerous, and rain more unequally diſtributed over the earth.

"A ſeries of epidemic diſeaſes, meaſles, influenza, affections of the throat, followed by peſtilential fevers, appear generally to commence and take their departure from ſome of the great agitations of the elements above recited. This, at leaſt, has been the caſe in America, in the four laſt periods, beginning with

 1756

1756 and 1757, 1769 and 1770, 1782 and 1783, 1788 and 1789. This fact will want no authority but a bare inſpection of the preceding hiſtory and tables.

"The continuance and varieties of the diſeaſes ſeem to depend on ſimilar diſturbances in the elements; and as the diſcharges and motions of the electrical fluid depend on no certain laws that are known, they are irregular, and may contribute to vary the order and nature of diſeaſes. In ſome caſes there has been a ſeries of epidemics for twenty years, in which the common order is not exactly obſerved; but this is not frequent. A remarkable inſtance occurred between 1727 and 1744.

"Thoſe periods in general have been moſt diſtinguiſhed for ſickneſs over the world, in which the fire of the earth has exhibited the moſt numerous and violent effects. Witneſs the periods from 1631 to 1637, when the three moſt noted volcanoes diſcharged immenſe quantities of fire and lava; and ſevere peſtilence extended over all Europe and America. A ſimilar remark may be made concerning the period of the laſt univerſal peſtilence in Europe, from 1663 to 1666—alſo, from 1691 to 1695—from 1727 to 1730—1759 to 1764—1769 to 1772—1774 to 1777—1783 to 1786—and concerning ſome ſhorter periods, all of which produced epidemics in both hemiſpheres.

"Slighter eruptions and earthquakes, which are almoſt annual, ſeem to have leſs effect. The fire of the globe is in perpetual motion or action, and to this great agent, philoſophers are agreed, are to be aſcribed the changes of the ſeaſons, and the generation of rain, hail, and ſnow. Its operations, however, are not all of them viſible, nor even perceptible, until they appear by their effects. It is probable that the *inviſible* operations of the electrical fluid produce more effects than thoſe which are ſeen. Indeed,

Indeed, we may queſtion whether moſt of the viſible phenomena of that principle are not mere *effects* of that action which influences the vegetable and animal world. It is probable to me that neither ſeaſons, earthquakes, nor volcanic eruptions, are the cauſes of the principal derangements we behold in animal and vegetable life, but are themſelves the *effects* of thoſe motions and inviſible operations which affect mankind. Hence catarrh, and other epidemics, often appear *before* the viſible phenomena of eruptions and earthquakes."

The coincidences here marked by the ingenious author are, no doubt, highly curious and intereſting: whether they go the length of eſtabliſhing the dependence of theſe occurrences on one another, in the relation of cauſe and effect, or whether they may all be conſidered as effects of one common cauſe, or merely as occurring caſually together, are points that in the preſent ſtate of our knowledge do not admit of ſatisfactory deciſion.

In the eleventh ſection of the work, Mr. Webſter proceeds to confirm his doctrine of the occurrence of peſtilential periods depending upon a vitiated conſtitution of the atmoſphere, by exhibiting proofs of an increaſe of mortality, at the ſame times, in diſtant parts of the world. Sometimes, he obſerves, a ſeries of epidemics falls with more violence on one hemiſphere than on the other; but ſcarcely in a ſingle inſtance has a courſe of diſeaſes been ſpread over one continent without ſhewing themſelves on the other. Remarkable examples of this increaſe of mortality are exhibited by a compariſon of the bills of burials in London, Amſterdam, Vienna, Breſlaw, &c., in the ſame ſeaſons, demonſtrating, beyond all doubt, the operation of a common noxious cauſe. Concurring with theſe ſickly ſeaſons in Europe, malignant epidemics were found to rage in Egypt,

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in the Levant, and in other eaſtern countries. And, by reſorting to records, ſimilar coincidences are found to have exiſted in different parts of our own country.

In the twelfth ſection Mr. W. treats of influenza, or epidemic catarrh, which he concludes evidently to depend upon occult qualities of the atmoſphere, from its ſudden invaſion of whole families, towns, and countries, as well as from the aſtoniſhing rapidity with which it ſometimes ſpreads over land and ſea, uncontrouled by heat or cold, drought or moiſture. This diſeaſe diſplays a wonderful coincidence in time, with earthquakes, volcanoes, unuſual ſeaſons, and the appearance of comets. Mr. W. has been enabled, by his reſearches, to enlarge the number of theſe epidemics, noted by Sauvages, Cullen, &c.

The order, connexion, and progreſſion of peſtilential epidemics, employ the attention of the author in the ſucceeding ſection. His object here is to prove, that the plague, and other peſtilential epidemics of the worſt kind, ſcarcely ever conſtitute an original, diſtinct, iſolated diſeaſe; but that they are the laſt or moſt mortal form of a ſeries of malignant diſtempers, whoſe riſe and progreſs, whoſe ſucceſſion and tranſition from one character and degree to another, as well as from one place to another, will generally admit of being ſatisfactorily traced. The order in which theſe peſtilential epidemics ſucceſſively appear is not always exactly the ſame; as they are varied by a multitude of ſubordinate cauſes, ſuch as ſeaſons, weather, noxious exhalations, &c. Mr. W. finds from the reſearches he has made, that the beginning of a ſeries of malignant epidemics is commonly marked by the appearance of influenza or catarrh, and ſometimes of meaſles or chin-cough: then follow the different ſpecies of angina, ſmall pox, or other eruptive diſeaſes, remittent fevers, petechial fevers, dyſentery, yellow fever, plague, &c. The progreſ-

ſiveneſs

ſiveneſs in the peſtilential principle, beginning with the prevalence of diſeaſes of a mild character, and aſcending, ſtep by ſtep, in a longer or ſhorter time, to ſuch as are more malignant and mortal, and the concurrence of this progreſſiveneſs, in diſtant regions of the earth, form the moſt important and inſtructive of all the reſults preſented by this hiſtory of epidemics.

On the ſubject of the extent of a peſtilential ſtate of air, Mr. W. obſerves, that epidemical diſeaſes are local or general; the former, thoſe which are limited to a particular town, city, or country; the latter, thoſe which pervade whole quarters of the earth, or the whole globe. The moſt univerſal epidemic is catarrh or influenza; the next, in extent of prevalence, he ſuppoſes to be meaſles; and then follow the different ſpecies of angina. It is well known, that peſtilential fevers have, on many occaſions, prevailed over vaſt tracts of the earth, and ſometimes, perhaps, throughout the world.

The fifteenth ſection is devoted to the exhibition of further proofs of the connection ſubſiſting between comets, earthquakes, volcanic exploſions, &c., and the prevalence of peſtilential diſeaſes. After this exhibition, the author proceeds to offer ſome conjectures concerning the cauſes of theſe phenomena, whoſe coincidence and connexion he thus labours to eſtabliſh. He aſcribes earthquakes, volcanic eruptions, &c., together with thoſe conſtitutions of the atmoſphere which produce peſtilential diſeaſes, to the operation of a common cauſe, and this cauſe he ſuppoſes to be the electric fluid. By a ſurcharge of the atmoſphere with this fluid, he believes, a ſtimulus too ſtrong for the healthy actions of the animal ſyſtem to be created; or, by certain unknown operations of it upon ſuch ſubſtances, the noxious power in queſtion to be generated.

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This opinion of the author, however, is little better than conjecture and hypotheſis. The former ſuppoſition of a morbid action of the electric fluid itſelf is oppoſed by the fact of the mild and often ſalutary effects of that fluid, when accumulated by inſulation in animal bodies. And the latter, of its combination or its action upon other ſubſtances, thereby generating a noxious agent, is ſo vague and hypothetical, as to contribute nothing to the enlargement of our knowledge on this ſubject.

In the ſixteenth ſection Mr. W. delivers the reſult of his inquiries concerning contagion and infection, and the means of diſtinguiſhing them from each other. The facts and illuſtrations on this ſubject poſſeſs great merit, and deſerve to be ſtudied with the utmoſt attention. He defines ſpecific contagion to be "that quality of the diſeaſe which, within a "ſuitable diſtance, communicates it from a body "affected with it to a ſound body, with great cer- "tainty, and under all circumſtances of ſeaſon, "weather, or ſituation." We believe a very important diſtinction between ſpecific contagion and other miaſmata, named infection by Mr. Webſter, conſiſts in the former being always a matter of animal ſecretion, and the latter a product of chemical action, independent of vaſcular and vital energy.

In the following ſection the author treats of the means of preventing or mitigating peſtilential diſeaſes. It will be obvious that, ſo far as theſe diſeaſes depend upon an occult and general conſtitution of the atmoſphere, it is beyond the power of human means to correct the cauſe. Much, however, may be done by the removal of all local cauſes by a free uſe of pure water, and by adopting proper means to guard and fortify our ſyſtems againſt the invaſion of theſe diſeaſes. Judicious directions are given for chooſing places of reſidence in the country, and an excellent plan is offered for building of cities, which we conſider of great importance, and take the liberty

berty to recommend to the attention of every American citizen.

The remainder of the work is devoted to remarks on the diſappearance of the plague in ſome parts of Europe, and the occurrence of new diſeaſes;—to obſervations concerning lunar influence, electricity, the popular modes of guarding againſt infection, veneſection, vapour of mephitic air, the revolution of certain comets;—and to a poſtſcript containing ſeveral additional matters.

ART. LXXIV. *Traité ſur le Climat d'Italie, &c. A Treatiſe on the Climate of Italy, conſidered in its Phyſical, Meteorological, and Medical relations. By* THOUVENEL.

Eſprit. des Journaux, tom. 30–ieme.

THE temperature of a country does not always depend on its latitude. Quebec, which is as cold as Peterſburgh, is in the latitude of Paris. In like manner, the ſalubrity of a country does not neceſſarily depend on its temperature. India and the North of Europe are equally healthful. Dry ſoils are ſometimes inſalubrious, and marſhy ones the contrary. Theſe general truths are applicable with all their force to the Italian climate, where are found the extremes of health and inſalubrity. Each country and each ſituation, therefore, requires to become the ſeparate ſubject of inquiry; for experience alone can decide with regard to them. M. *Thouvenel* has inveſtigated with much induſtry the various cauſes of the unhealthfulneſs of different parts of Italy, and points out the means which he conceives capable of remedying it; the chief of which is, draining the marſhes which there abound.

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The conſtitution of the inhabitants of the country, likewiſe, engages his attention. He ſtrongly oppoſes the uſe of blood-letting in Italy, eſpecially in the city of Rome. This evacuation, he obſerves, is neither indicated by the habit of body of the Romans, which is generally more pituitous than ſanguine; nor by the climate, the heat of which, joined with moiſture, depreſſes the power of the ſyſtem; nor, laſtly, by the nature of the diſeaſes themſelves, the conſtant character of which is, an univerſal proſtration of the vital forces. He cautions us at the ſame time againſt an exceſſive uſe of ſtimulating remedies, and combats, in this reſpect, the doctrine of *Brown* and his followers. This doctrine, he remarks, is founded for the moſt part, on a ſingle principle,---animal excitability. According to this hypotheſis, there are only two modes of diſeaſe, *ſthenic* and *aſthenic*, the *ſtrong* and the *weak*: in the ſame manner, there are only two modes of cure, the *weak* and the *ſtrong*: one ſingle organic *paſſive* faculty, excitability; one ſingle phyſical active power, *ſtimulation.* This doctrine M. *Thouvenel* labours to ſubvert; with what ſucceſs will be differently eſtimated by the partizans on the different ſides of the queſtion.

Art. LXXV. *Obſervations on the Nature, Cauſes, Prevention, and Cure of Gout and Rheumatiſm; to which are annexed Phenomena Phyſiologiæ, iſſuing in the Cure of theſe Diſeaſes. By* William Peter Whyte. Twelves, 125 pages. Price 2s. 6d. London, 1800. Rivingtons.

THE author's profeſſed object in this undertaking is ‘ to familiarize to the neighbourhood the origin and nature of two kinds of diſeaſe, very prevalent, but perhaps miſunderſtood among us.’ With reſpect to the immediate cauſe of the former, he

he remarks, ‘ that the matter of gout would appear to conſiſt, chiefly, in a peculiar modification or combination of the animal fluids, of a ſpecific chemical deſcription; which accumulates, and ſometimes concretes, in the body, and produces the various miſchiefs this diſeaſe unfolds.’ On the ſubject of the cure, the author is very brief; and concludes by obſerving, that ſuch articles of the *materia medica* as will contribute to the cure, ſhould be employed. The practitioner's diſcretion muſt decide in this caſe; and on his judgment the patient muſt rely.

Rheumatiſm (‘ ρευματισμος, from ρεω, to flow; becauſe the pain frequently *ſeems to flow along the limbs*,’) is next elucidated. The cure here alſo is barely hinted at. ‘ As every man has a conſtitution and temperature of body properly *his own*, diſeaſe in him will diſcover peculiarities requiring the practitioner's attention. The author, therefore, cannot conſiſtently, either with honour or ſcience, pretend to predetermine what ſhall do him good, and no harm.’

The *phenomena phyſiologiæ* conſiſt of a detail of caſes cured by the author's medicines; which may be had at his reſidence at Stourbridge, “ where patients are attended, or families at their own houſes !”

MISCEL-

MISCELLANEOUS INFORMATION.

On Cow-pox.

THE teſtimonies in favour of the Vaccine Inoculation continue to be multiplied in various quarters. The moſt eminent practitioners on the continent have adopted the new practice, and with a degree of ſucceſs not inferior to that which has attended it in Britain. Inſtances of a contrary tendency have been brought forward; but many of theſe are evidently defective in the evidence they afford: others will have more or leſs weight with different perſons, as partiality or prejudice operates in determining the judgment. They ought not, however, we conceive, to be overlooked; nor ſhould the great weight of evidence in favour of the new practice lead us to queſtion the accuracy of all reports of a different tenor: for the general queſtion is ſtill open to inveſtigation. In bringing forwards the unfavourable inſtances, we ſhall not, therefore, we truſt, be ſuſpected of invidious motives: our only aim is to bring an important queſtion to a certain and ſpeedy iſſue.

Dr. *Harriſon*, of *Horncaſtle*, in a Letter to Sir *Joſeph Banks*, mentions the caſe of a child, five months old, who was inoculated a ſecond time (it having been once done without effect) with vaccine matter. The progreſs of the puſtule which ſucceeded was unuſually rapid, and was characterized by an areola that was neither extenſive nor circumſcribed. With matter taken from the arm of this child, the vaccine diſeaſe was regularly propagated through ſeveral ſubjects, all of which were ſubjected to variolous inoculation ſix months afterwards, together with the child from whom the matter was procured. They all eſcaped infection, except the child herſelf, who had a mild ſmall-pox, with a moderate eruption. Hence

Hence it appears, that ſhe communicated a ſecurity againſt the ſmall-pox to others, although ſhe herſelf remained liable to its influence: a fact by no means ſingular, as there are ſeveral well atteſted caſes of the ſame thing with regard to ſmall pox.

Med. and Phys. Jo. No. 24.

Dr. *Woodforde*, of *Caſtle Cary*, has adduced a caſe that ſeems to militate againſt the permanently preventive influence of the vaccine diſeaſe. He obſerves, that he lately attended a Mrs. *Dredge*, aged 55 years, whom he found labouring under ſmall-pox of the diſtinct ſort, which ſhe caught from a ſervant-boy living in the houſe. She informed him that ſhe did not expect this diſeaſe, ſince ſhe had taken, twenty-eight years before, the cow-pox from milking cows affected with the ſame, and her ſiſter alſo ſuffered ſeverely from the ſame cauſe. The cow-pox, ſhe remarked, was very ſevere, numerous puſtules ariſing on the hands and fingers, with tumour in the axilla, and a great degree of pyrexia. Sixteen years afterwards ſhe was much expoſed to ſmall-pox in her own family, having children ill of it, both naturally and from inoculation, whom ſhe conſtantly attended, but eſcaped infection. The ſiſter was in like manner expoſed to variolous infection, but without receiving it.

Ibid.

It ſeems of conſequence to correct a notion that has been very generally circulated by the friends of the vaccine inoculation, reſpecting the invariable mildneſs of the ſymptoms of the diſeaſe, as if little or no inconvenience was at any time produced by it. We had occaſion to mention in our laſt Number* ſome very unpleaſant and alarming ſymptoms which attended the operation in ſome inſtances, and pointed out what was conceived to be the occaſion of them. From what we are about to ſtate, it will appear doubtful how far they are attributable to the cauſe then ſuggeſted.

* Vide page 387.

Mr.

Mr. *Maddock*, a ſurgeon of *Nottingham*, relates the following caſes and obſervations on the ſubject. ‘ On the 22d of October, 1800, I inoculated Mr. Hulſe’s child, aged 6 months, with fluid matter taken on the eighth day from the arm of a child who had the diſeaſe very favourably. Until the eighth day appearances were promiſing, and indicated a mild diſeaſe; but on the ninth, the parts ſurrounding the inciſion began to inflame, and became very hard: the inoculated part, inſtead of putting on a puſtular appearance, degenerated into an ulcer, and at this time much derangement of the ſyſtem took place, as fever, ſickneſs, and great inquietude. I applied emollient cataplaſms to the arm, and dreſſed the ſore with equal parts of *ungt. hydrarg. nitrat.* and *ungt. ceræ;* notwithſtanding the uſe of which, and warm fomentations, &c., the parts changed their appearance very little until the ſixteenth day, when the inflammation extended to the ſhoulder and hand, on the fingers of which ſeveral veſications appeared. When theſe parts became the ſeat of diſeaſe, the inflammation completely left the inoculated part, and the ulcer acquired a healthy aſpect. As the inflammation left the hand and ſhoulders, it ſpread to the back, breaſt, and face, on the ſame ſide, and after remaining there about twenty-four hours, it diſappeared, leaving the parts very much diſcoloured, and attacked the other ſide of the back and breaſt, and afterwards the arm and hand; but before it became ſo violent as on the ſide firſt affected, the child was exhauſted by want of reſt and exceſſive irritation, and died on the 26th day after inoculation. It is right to ſtate, that, on the twelfth day, the nurſe who ſuckled this child was taken ill of an inflammatory rheumatiſm, and continued ſo during the time it lived; and as it refuſed almoſt every other kind of food but the breaſt milk, I fear its ſymptoms might be increaſed by the neceſſity we were under of allowing it the breaſt to keep it quiet and to give it nouriſhment. Not having ſeen

ſeen or heard of any caſe ſimilar to this, I was willing to attribute the ſymptoms to accidental cauſes; but, a few weeks afterwards, another caſe occurred, which, from its near reſemblance to this, convinced *me* they were the conſequence of the cow-pox.

'On the 27th of November, I inoculated in both arms a very healthy child of Mr. Green's, of Lenton-Abbey, aged five months, with fluid taken on the ninth day from the arm of a child equally healthy. Previous to the eighth day there was no appearance which indicated any thing unfavourable. The inciſions on each arm were gradually elevated into ſmall puſtules, filled with limpid matter, with a ſmall inflammation round their baſe. On the ninth day the inflammation on the left arm ſpread very rapidly, and before the next day it occupied the whole arm, but without any veſications, as in the preceding caſe. By the twelfth day the inflammation was much diminiſhed on the arm, but appeared on the back, breaſt, and face on the ſame ſide. At this time the inciſion on the left arm, which, on the tenth day, had degenerated into a ſordid ulcer, became almoſt dry, and began to form a ſcab, the inflammation ſurrounding being intirely gone. After the inflammation had continued on theſe parts about twenty-four hours, it removed to the right arm, which was now dry, and had ſcabbed over.

'It extended from the ſhoulder to the elbow, and alſo affected the right ſide of the body in a ſimilar manner it had the left, and after having exerciſed a kind of ſportive fancy on different parts of the body, for at leaſt five weeks, a ſmall abſceſs formed in the axilla, on the right ſide, and the child perfectly recovered. The inciſions in both the children's arms were made very ſuperficial and ſmall, and the matter was uſed a few hours after it was taken, being firſt diluted with a little warm water. Mr. Green's child was at its mother's breaſt, and had it not experienced the moſt unremitting attention, I have much reaſon to fear

fear the conſequences might have proved ſerious. From this child's right arm I took ſome matter on the ninth day, with which I inoculated two children, each of whom paſſed through the diſeaſe as favourably as ever I ſaw.'

Witticiſm on the Word Oxygene.

A French *wit*, in the *Journal de Phyſique*, has endeavoured to ridicule the conſtruction and uſe of the word *oxygene* in the new chemiſtry; obſerving, "If "I forbear to employ the term *oxygene*, the reaſon "is, that it ſignifies *ſon of a vinegar-merchant:* oxis, "oxidos, in Greek ſignifying *a vinegar-merchant;* as "*Diogène* means *ſon of Jupiter;* and *Archigene*, *ſon of* "*a chief*." The futility of this mode of reaſoning is clearly pointed out, by the editors of the *Annales de Chymie*, who conſider it as a direct attack on the principles and phraſeology ſo ſucceſsfully promulgated by them.

The diſſyllable *oxy* is not derived, as the critic ſuppoſes, from οξις-ιδος, but from ὀξὺς-εος, *ſour*, *ſharp*; whence the Greeks themſelves derived οξυύω, *I render acid*, ὀξιζω, *I am acid*, ὀξύμαλα, *ſour apples*, ὀξύγαλα *ſour milk*, &c. Beſides this, it was not the vinegar-merchant that the Greeks called οξις, but the veſſel which contained this liquor.

With reſpect to the words *Diogene* and *Archigene*, there is no authority for ſuppoſing they were other than proper names, without any reference to the roots here alluded to. In ſhort, if this objection were admitted, we ſhould not only proſcribe the terms *oxygene* and *hydrogene*, but *homogene* and *heterogene* ought, in like manner, to be baniſhed from uſe. There is, however, little probability that this will be the caſe: the term *oxygene* has been adopted in almoſt every chemical work, from whence it has paſſed ſucceſſively to thoſe on philoſophy, medicine, and pharmacy: it has been received by foreigners with no other modifications than the genius of their language

language required; thus it is called *oxygene* by the Engliſh; *oſſigeno* by the Italians; *oxigene* by the Dutch; *oxigenium* by thoſe who would latinize it, &c. &c. The Germans, indeed, have replaced it by the word *ſaure-ſtoff*, the acid principle, as they ſay *waſſer-ſtoff*, the principle of water. It would, however, ſeem proper always to write ox*y*gene, and not ox*i*gene, for the ſame reaſon that we write h*y*drogene rather than h*i*drogene.

On the Phenomena of Galvaniſm.

M. *Robertſon*, Ex-Profeſſor of Natural Philoſophy at the Central School of the Department of De l'Ourte in France, and who has paid much attention to the phenomena of Galvaniſm, and repeated thoſe of M. *Volta* with the metallic column, is inclined to reject the electric fluid as the ſource of thoſe phenomena, and to attribute them to an acid *ſui generis*. This opinion, he thinks, is warranted by the principal facts on the ſubject. 1. By the reddening the tinctures of violets and of turnſol incloſed in glaſs tubes for affording a paſſage to the galvanic fluid through them. 2. From the oxidation of heterogeneous metals piled on one another and moiſtened, a kind of white ſalt being at the ſame time formed. 3. The braſs wire which becomes oxidated in the decompoſition of water, depoſits a ſubſtance which ſeems to be a ſpecies of *galvanade*. 4. The galvanic fluid, with regard to the microſcope and the ſenſations, produces effects reſembling thoſe which the acids preſent.

Intereſting Facts in Chemiſtry.

Dr. *Woodhouſe*, Profeſſor of Chemiſtry in the Univerſity of Pennſylvania, in a Letter to Profeſſor Mitchill of New York, communicates ſeveral intereſting chemical facts obſerved by him, and amongſt others the following.

Of the non-action of the nitric acid on ſilver, copper, and tin. It is the common opinion of chemiſts, that the nitric acid diſſolves ſilver with the utmoſt rapidity. Dr. W. found, however, that thin pieces of this metal, and even its filings, might be digeſted in the moſt pure and concentrated acid, prepared by diſtilling ſtrong ſulphuric acid on nitre, from which the water of cryſtallization was previouſly evaporated by heat, without being diſſolved: the digeſtion was continued for 48 hours; the temperature of the atmoſphere varying between 75 and 90 degrees of Fahrenheit's thermometer. On adding a ſmall quantity of water to the acid, the ſilver was diſſolved in a few minutes.

Repeating this experiment upon copper, and upon tin, the ſame effect took place. Zinc and biſmuth are diſſolved by the acid, however concentrated. From theſe facts, therefore, Dr. *W.* obſerves, the language of chemiſts in future ought to be—that the nitric acid has no action on ſilver, copper, and tin; but if water be added to the acid, ſolution ſpeedily takes place.

Dr. Hope has taken notice of the non-action of the nitric acid on ſtrontian earth; and Mr. *Leonhardi* has remarked, that it quickly deſtroys wood and ſilk, but that linen may remain immerſed in a bottle of the ſtrong acid a whole day without injury.

Of the difference in the quantity of ammoniac obtained from bones, by diſtilling with and without a lute. It was found that five times as much of the volatile alkaline ſpirit could be obtained by carrying on the diſtillation without a lute, as could be procured in the ſame ſpace of time with the application of the lute. Lavoiſier ſuppoſes, that when ammoniac is obtained from animal ſubſtances, the hydrogene and the azote of theſe bodies unite together, and form the volatile alkali; but it appears from what has been ſaid, that the azotic air of the atmoſphere enters into the worm of the refrigeratory, joins the hydrogene of

of the bones, and ſo forms the ammoniac.—Manufacturers of the volatile ſpirit of ſal ammoniac may take ſome valuable hints from theſe experiments.

Of putrid urine expoſed to the froſt. A quart of the moſt putrid urine, and of as yellow a colour as gamboge, was expoſed, two nights, to intenſe cold, when it became perfectly ſweet, and was as colourleſs as rock-water. May not this wonderful change, Dr. W. aſks, be attributed to the agency of the oxygen gas of the cold atmoſpheric air?

The acid of citrons not only neutralizes the volatile alkali of putrid ſubſtances, but completely deſtroys the nauſeous ſmell which exiſts, independent of the ammoniac. The ſulphuric and muriatic acids have no ſuch effect. Does the oxygen of the citric acid act here likewiſe? *Lowitz*, a Ruſſian chemiſt, ſuppoſes that charcoal neutralizes the putrid effluvia of animal bodies; but, in Dr. W.'s opinion, it acts mechanically, in preventing the putrid particles of matter from flying into the air.

Of the compoſition of flores martiales & ens veneris. The French chemiſts ſay that the flores martiales are compoſed of ſal ammoniac, coloured by an oxyd of iron, and that ens veneris is ſal ammoniac coloured by an oxyd of copper. From the experiments of Dr. Woodhouſe, however, it appears that the colour in theſe compounds depends on the muriates of the different metals, and not on the oxyds.

Of the eudiometer. The eudiometer is a uſeleſs inſtrument in aſcertaining the purity of atmoſpheric air: 1ſt, becauſe nitrous air can never be obtained of the ſame degree of ſtrength: 2d, the abſorption is great or ſmall, according to the time the air remains over the water, or is agitated in it. Hence it is probable, that Mr. *Davidſon* was deceived in ſuppoſing that the air of Martinique was much purer than the air of Europe, and that the error lay in his inſtrument.*

N. Y. Med. Rep. V. 3. No. 2.

* See Med. and Chir. Rev. Vol. 6. p. 361.

Effects of Pain in removing Stupor from Opium.

The following communication respecting the effects of pain in obviating the deleterious influence arising from opium taken to excess, deserves the attention of practitioners: it is furnished by Dr. *Valentine Seaman*, a physician of New York.

'I was called yesterday to see the wife of —— *Head*, in Water-street, who had, about two hours before, taken an ounce of laudanum, and then lay in a deadly stupor, from which all the efforts of her friends were insufficient to awaken her. Attempts had been made to get some vinegar into her stomach, but, I believe, with little effect; nor did I succeed much better in endeavouring to give her a dose of white vitriol. I then procured a small switch, and applied it pretty freely to her arms and shoulders, which were defended only by a thin linen covering. I also applied some strokes to her legs. In the course of a very short time, indeed almost immediately on the application of this remedy, she roused up, and begged me to desist. She continued, for a time, much confused, with involuntary turns of laughter. Two scruples of white vitriol were then administered, followed, in about fifteen minutes, by half a dram of ipecacuanha; notwithstanding which, and also having her throat repeatedly tickled with an oiled feather, it was near an hour before she could be made to puke: however, finally, she puked, and, by the assistance of frequent draughts of warm water, her stomach was pretty thoroughly evacuated.

'By the assistance of her friends she was kept awake, or, at least, slept but little at a time during the night, and this morning appears intirely recovered.'

Method of procuring perfectly-carbonated Kali.

Some ingenious methods of saturating *kali* with *carbonic acid* are mentioned by M. *Lowitz*, in *Crell's* Chemical Journal. It is well known that common kali

kali is but imperfectly ſaturated with the carbonic acid, a part of it uſually remaining in a cauſtic ſtate. This cauſtic part it has been the practice to ſaturate, either by expoſure for a length of time to the atmoſphere, or by other means. By the methods here pointed out, the cauſtic part is ſeparated from that which is actually carbonated. This is done in two ways; firſt, by means of ſulphur; ſecond, by means of the acids.

When diſtilled vinegar is added to the common kali in the preparation of the acetite of kali (*ſal diureticus*) it firſt combines with the cauſtic or pure part of the ſalt, and conſequently no effervеſcence takes place till that has been completely ſaturated. Taking advantage of this circumſtance, M. *Lowitz* diſſolved a quantity of purified common kali in an equal, or which is ſtill better, in double its weight of water, and then added, by ſmall quantities at a time, diſtilled vinegar, till, on ſtirring the mixture, effervеſcence began to take place. The fluid was then evaporated over a very ſlow fire (not being ſuffered to boil, leſt the carbonic acid ſhould be driven off), till a film of ſalt appeared upon it. The carbonated kali was then depoſited in cryſtals, from which the remaining liquor was ſeparated by filtration, and evaporated once or twice pure. The acetite of kali, and the imperfectly carbonated kali, remain behind in the lixivium, and may be readily obtained from it. The cryſtals of carbonated kali were purified in the ordinary manner.

For the ſame purpoſe the ſulphuric acid may be employed, but it muſt previouſly be diluted with a very large proportion of water. In this proceſs, the ſulphate of kali firſt cryſtallizes, and then the carbonate.

A completely ſaturated carbonate of kali may be obtained by the aid of ſulphur, in the following manner. Diſſolve any quantity of purified common kali in

in two or three times its weight of water: boil the ſolution gently, and add gradually finely powdered ſulphur, till no more appears to diſſolve. Evaporate very ſlowly to the point of cryſtallization, and purify the cryſtals by repeated ſolution, filtration, and evaporation, from their admixture with liver of ſulphur and common kali. In this proceſs which is the leaſt troubleſome of the two, the ſulphur is only attacked by the cauſtic part of the kali.—Whether the ingenious methods here mentioned of ſaturating kali with carbonic acid, be preferable or not to the more ſimple mode of expoſure for a time to the atmoſphere, or the other methods in uſe, we are not prepared to determine.

Method of Preparing the Acetic Acid.

A new and oeconomical method of preparing the acetic acid has been propoſed by M. *Badollier*, a practitioner in pharmacy, at Chartres, a town in France. It conſiſts in diſtilling, *in balneo arenæ*, from a glaſs retort, with an adapted receiver, a mixture of equal parts of ſulphate of copper (blue vitriol) and acetite of lead (ſaccharum ſaturni). The diſtillation takes place very readily in this way, and with a very moderate degree of heat. The acid thus obtained is free from any empyreumatic odour, and is not inferior, either in quantity or quality, to that obtained by diſtillation from the acetite of copper. Beſides the ſaving in point of time and fuel, the price which the acid prepared in this new method bears to that prepared by the acetite of copper is as one to four. No precipitation took place on the addition of a ſolution of muriate of barytes; a proof that the acid thus obtained contains no particle of ſulphuric acid.

Ann. de Chym. No. 109.

On

On the new Species of fixed Alkali.

The new ſpecies of fixed alkali which M. *Hahneman* pretends to have diſcovered lately, and which he vends at a conſiderable price, turns out, on the analyſis of M. *Klaproth*, of Berlin, to be nothing more than refined borax. This ſuppoſed diſcovery of M. *Hahneman* has been pompouſly announced, in various literary journals, under the title of *alkali pneum.*

Ibid.

Of the Poiſon of Serpents.

Some experiments and obſervations on this ſubject have been lately publiſhed in the *Aſiatic Reſearches*, v. 6, by Mr. *Wm. Boag*, ſurgeon at Bombay, in the Eaſt Indies. This gentleman is of opinion that the nature of the venom is the ſame in all the varieties of this reptile: of this, however, no direct proof is offered, and it is in oppoſition to the ſentiments of moſt writers on the ſubject, and is beſides improbable, when we conſider the different ſymptoms excited by the bites of different ſpecies. With reſpect to the manner in which the venom operates in the ſyſtem, Mr. *Boag* conjectures that it acts upon the blood, by attracting the oxygen which this receives from the atmoſphere in its paſſage through the lungs, and upon which its vitality depends. This opinion he endeavours to ſupport by the following arguments.

1. Man, and other warm-blooded animals, expoſed to an atmoſphere deprived of oxygen quickly expire. The poiſon of a ſerpent when introduced into the blood, alſo cauſes death; but carried into the circulation by a wound, and in very ſmall quantity, its operation is comparatively ſlow and gradual.

2. The appearances on diſſection in both caſes are very ſimilar. The blood becomes of a darker hue; the irritability of the fibres are nearly to the ſame degree deſtroyed; and the body has a ſtrong tendency, in both inſtances, to putreſcency.

3. Dr.

3. Dr. Mead mixed the venom of the viper, and healthy blood together out of the body, and he did not perceive that it produced any change in its appearance: this aroſe from his mixing a ſmall quantity of the venom with a large quantity of the blood: but if two or three drops of venom be mixed with forty or fifty drops of blood, it immediately loſes its vermilion colour, becomes black, and incapable of coagulation.

4. The poiſon of the ſerpent has moſt power over thoſe animals whoſe blood is the warmeſt; while, on the contrary, it is not a poiſon to the ſerpent itſelf, nor in general to cold-blooded animals.

Theſe arguments do not appear to us to have much weight: it is not conceivable that the ſmall quantity of poiſon ſufficient to deſtroy an animal can effect any important chemical change in the maſs of its blood; nor do the experiments of the author, recited below, afford them any ſupport. Conſiſtently with his theory, he ſuggeſts the uſe of oxygenated remedies for the cure; as the nitrous acid, the nitrate of ſilver, and the like: but the experiments give very little countenance to the idea. His experience of the ſubject, indeed, ſeems very limited. The following experiments were all made with the ſame ſerpent, a *cobra de capello*, and which is generally repreſented to be the moſt venomous of all ſerpents. How far they tend to confirm the conjectures of the author, the reader will judge.

Exp. 1. ‘ I was, in the firſt place, deſirous of aſcertaining the power of the venom: for this purpoſe, the ſnake was made to bite a young dog in the hind leg, and for which no medicine, either internal or external, was made uſe of. The dog, upon being bit, howled violently for a few minutes; the wounded leg ſoon became paralytic; in ten minutes the dog lay ſenſeleſs and convulſed; in thirteen minutes he was dead.

Exp. 2.

Exp. 2. ‘ A dog of a ſmaller ſize and younger was now bitten in the hind leg, when he was inſtantly plunged into a warm nitric bath, previouſly prepared for the purpoſe: as ſoon as poſſible after he was in the bath, the wound was ſlightly ſcarified, and a weak ſolution of lunar cauſtic in water was poured down his throat: but the ſymptoms made the ſame progreſs as in the firſt experiment, and the dog died in the ſame time. Upon opening the two dogs about half an hour after death, the blood in the heart, and the larger veſſels, was of a dark colour, in a fluid ſtate, and did not coagulate on expoſure to the atmoſphere.

Exp. 3. ‘ After the interval of one day, the ſame ſnake was again brought, and made to bite a young puppy in the hind leg; but above the part to be bitten, I had previouſly tied a ligature: immediately after he was bitten, the wound was ſcarified and waſhed with a ſolution of lunar cauſtic. The dog did not appear to feel any other injury than what might ariſe from the ligature round his leg: half an hour after he was bitten, the ligature and dreſſing, which conſiſted of lint dipped in the ſolution of lunar cauſtic, were removed. The dog ſoon began to ſink, gradually loſt the uſe of his limbs, breathed quick, was convulſed, and died in half an hour more. On opening this dog, the blood coagulated readily on being emptied from the veſſels.

Exp. 4. ‘ Another dog was now bitten in the hind leg, and immediately after a ligature was applied, as in the preceding experiment: the wound was ſcarified and waſhed as before, and for two hours the dog continued lively and well; when the ligature was removed.

Exp. 5. ‘ Another puppy having been bitten in the ſame place, the wound was ſimply ſcarified; and waſhed with a ſolution of the lunar cauſtic, and for two hours the animal continued free from diſeaſe. In theſe two laſt experiments the dogs were very young, and fed by their mother's milk: at the expiration

ration of the time mentioned, they were carried to her, but ſhe avoided them, and they both died in the courſe of the day.

Exp. 6. ' Obſerving in the laſt experiments, that the venom was probably weakened by uſe, I waited for two days, and reſolved to try its effects a ſecond time, where no medicine was made uſe of. A dog was accordingly bitten by the ſame ſnake in the hind led in the uſual manner, and in twenty minutes he was dead. It is, however, worthy of notice, that though the mortal progreſs of the poiſon was as certain as before, it did not now appear to produce any pain; the animal did not howl upon being bit, but gradually ſunk, and died. The blood of this dog continued alſo in a fluid ſtate, and was of a dark colour.

Exp. 7. ' A ſecond dog being now bit, the wound was ſcarified and waſhed with a ſolution of lunar cauſtic, and the ſame medicine given in ſmall quantities internally, and repeated at intervals. The dog appeared to be but little affected for about half an hour, when he vomited violently for ſeveral times, gradually ſunk, and died at the expiration of an hour. The blood in this dog coagulated after death.

Exp. 8. ' A third dog being bit in the ſame manner, the part was waſhed with a volatile alkaline ſpirit, and the ſame medicine given internally, diluted with water, and repeated at intervals. This dog was in a ſhort time convulſed; vomited ſeveral times, and then ſeemed to revive: but he ſoon relapſed, and in three hours he was dead. This dog was not opened.

Exp. 9 ' After the interval of two days, the ſame ſnake was brought, and as the volatile alkali appeared to have been of ſome uſe in the laſt experiment, it was determined to try it firſt: and this experiment, as well as ſeveral of thoſe already related, was conducted by my friend, Dr. *Moir*, with attention and accuracy. A dog was accordingly bitten in the uſual

uſual place, and the volatile alkali given as in the preceding experiment: the dog was dead in eighteen minutes.

Exp. 10. ' To a dog bitten in the ſame place, immediately after the former, that we might have the means of aſcertaining the effects of the remedy, nothing was given: he died in eighteen minutes.

Exp. 11. ' Obſerving in the ſeventh volume of the medical facts, publiſhed by Dr. *Simmons*, that *Cayenne* pepper was a powerful remedy for a vegetable poiſon, obtained from the roots of the *jatropha manihot*, or bitter *caſſada*, I determined to make trial of it. To a dog bitten in the uſual manner, five grain pills of the pepper were given, and the wounded limb was waſhed with an infuſion of it in warm water. Theſe pills had been repeated four times in the ſpace of an hour, when the dog died.

Exp. 12. ' A young puppy was now bitten in the ear, and, exactly half a minute after, the ear was cut off. The wound made by the knife bled freely. The dog continued lively for ſome time, but in half an hour he began to droop, and in half an hour more died. It is obſerved by *Fontana*, and he ſufficiently accounts for it, that, on biting the ears of animals, a drop of venom collects on the ear, at the hole made by the tooth: this was very remarkable in the experiment now related; a quantity of venom, like a large drop of yellow ſerum, collected on the ear, and trickled to the ground.

' It may be proper in general to obſerve, that in all theſe experiments, the part bitten did not ſwell nor inflame; a livid mark could be diſtinguiſhed where the tooth entered, but could be traced only for a very little way. When the wounds were ſcarified, they bled little or none at all; but before death they commonly bled freely, and the ſcarifications were exceedingly diſcoloured.

' In

‘ In all the dogs that were opened, the blood was found to be in a fluid ſtate. Upon examining, after death, thoſe animals which died by the poiſon of the viper, the Abbé *Fontana* commonly obſerves that he found the blood accumulated about the heart and larger veſſels. My experience has not confirmed this obſervation, which I attribute to the great difference in point of ſtrength poſſeſſed by the ſnake made uſe of in the preceding experiments. In thoſe caſes where the poiſon acted rapidly, the blood, when emptied from the veſſels, ſhewed no diſpoſition to coagulate, and ſeemed to be of a darker colour than natural: but in thoſe caſes where the animals died more ſlowly, the blood readily coagulated on expoſure to the atmoſphere. It is not foreign to the preſent ſubject to obſerve, that while the poiſon of ſerpents, in mingling with the blood, has a ſtrong tendency to prevent its coagulation, it on the contrary more readily coagulates in thoſe animals who have breathed pure or oxygen air.

‘ Theſe experiments will perhaps ſerve little other purpoſe than to prove the quick and deſtructive operation of the poiſon of this kind of ſerpent, and of the inefficacy of the moſt celebrated remedies which have been hitherto diſcovered. It is certain, however, that upon larger animals the progreſs would have been neither ſo rapid nor deſtructive, and upon the human body it is alſo probable that remedies might have been employed with greater ſucceſs: for the delicacy of the human ſkin is very great, and the abſorption of any remedy that might be applied to it extenſive and ſpeedy. Dogs, we are told, do not perſpire, and it is probable that there exiſts much correſpondence between the powers of abſorption and perſpiration.

‘ The little ſucceſs attending the uſe of the lunar cauſtic in theſe experiments, afford a ſufficiently convincing proof, that the ſnakes made uſe of by the Abbé *Fontana*, and the one made uſe of by me, poſſeſs

poſſeſs very different degrees of ſtrength in their venom. There are one or two experiments where this remedy appeared to be uſed with ſome effect; but I imputed it to the weakened power of the venom by uſe; and I am fully convinced that the poiſon of this kind of ſerpent, when it is in full vigour, is ſo certainly and rapidly deſtructive, at leaſt to ſmall animals, that neither the lunar cauſtic, nor probably any other remedy, would arreſt its progreſs. It appears that even the delay of half a minute in cutting off the ear that was bitten, was fatal to the animal; and it is ſcarcely poſſible that to a perſon bitten by a ſnake, any kind of remedy could be applied in a ſhorter time. No experiment could be better calculated than this laſt, to ſhew the power of the venom of this kind of ſerpent; for *Fontana* obſerves, that it is very difficult to kill either dogs or rabbits when bitten in the ears; and out of all the experiments he makes upon the ears of theſe animals, and where no attempt was made to relieve them, none of them died.'

Obſervations in Natural Hiſtory, made in the Summer and Autumn of the Year 1800: *by Dr.* S. L. MITCHILL, *Profeſſor of Chemiſtry in New York.* (Extracted from Med. Rep. Vol. 4, No. 2.)

Hybrid variety of the Almond-nut. 'Among the trees in my peach-orchard grows a thrifty young almond *(amygdalus communis)*, which has borne fruit for two or three ſeaſons. On taſting them this year, we were all ſenſible of a reſemblance between the flavour of the kernel of the almond and that of the peach *(amygdalus perſicus)*. And in ſome, ſoon after gathering, their peculiar bitterneſs reſembled ſo nearly that of the peach-kernel, that the former might, by an unadviſed perſon, almoſt have been miſtaken for the latter. It was remarkable, too, that the nuts (drupa) were very hard and ſolid, like the peach-ſtone, and required ſmart ſtrokes of the hammer to crack them.—Hybrid plants have long been known to

to botaniſts and cultivators, and their numbers ſeem to be increaſing.—I was led to believe, according to the received doctrine of ſexes in plants, that the *fruit* and *kernel of the almond* had, in this inſtance, undergone a change, by growing in the midſt of many trees of a different ſpecies. And if the pollen, or fecundating powder, of the peach has really wrought ſuch an effect upon the almond, is not this a new mongrel, and an additional fact in favour of the ſexual ſyſtem?'

Domeſtication of the Wild-gooſe (anas canadenſis). ' Attempts have frequently been made on Long-Iſland to render the wild-gooſe, which winters in the bays adjoining the Atlantic Ocean, a tame and domeſticated bird. Individuals of this ſpecies have accordingly been catched by the gunners, after having been wing-broken by a ſhot, and carried home free from any other injury. When thus diſabled from flying, they become gentle, and will mate with common geeſe. They even breed together; but the offspring is a mule, incapable of further propagation. Mr. Daniel Coles, of Oyſter-bay, has gone a ſtep beyond others in this buſineſs. He has a wild-gooſe and gander in a domeſticated ſtate, whom he keeps from flying away by taking off the extreme bones of the wings at the joint. The gooſe has hatched a brood of goſlings. For fear of loſing the young ones, their wings have been treated in the ſame manner; and the whole family now compoſes (September 1800) a beautiful flock of wild-geeſe in a domeſticated ſtate. They are as gentle as common geeſe, and live upon the food obtained about a houſe and on a farm quite as well. Mr. Coles even found that the goſlings, on the day of being hatched, ate Indian meal as well as chickens. They are more active and handſome than the tame-gooſe; and their long necks are arched more like thoſe of ſwans. If this experiment ſhould be continued for ſeveral generations, it is highly probable the temper and

and habits of the breed may be changed, ſo that the deſcendants of theſe wild-geeſe may loſe their inclination to fly from country to country, and attach themſelves, like turkeys, ducks, and other birds whoſe progenitors were once wild, to the ſociety and protection of man. Should Mr. C. meet with no diſaſters, it is not improbable that the wild-gooſe will be eventually added to our ſtock of poultry.'

Another inſtance of a Negro turning white. 'The change of colour which *Harry Moſs* has, within a few years, undergone, from black to white, has been publiſhed ſo often, that few curious perſons are ignorant of it.* In the town of North-Hemſtead, ſomething of the ſame kind is now to be ſeen. A young negro, named *Maurice*, aged 25 years, began about ſeven years ago to loſe his native colour. A white ſpot appeared on the right ſide of his belly, which is now about as large as the palms of two hands; another white ſpot has appeared on his breaſt, and ſeveral more on his arms and other parts; and the ſable cloud is plainly diſappearing on his ſhoulder. The ſkin of theſe fair ſpots is not ſurpaſſed by the European complexion. His general health is and has been good; and he has ſuffered no ſcalding, ulceration, ſcabbineſs, or other local diſeaſe. The change is not the dead white of the *Albinos*, but is a good wholeſome carnation hue. Such an alteration of colour as this militates powerfully againſt the opinion adopted by ſome modern philoſophers, that the negroes are a different *ſpecies* of the human race from the whites, and tends ſtrongly to corroborate the probability of the derivation of all the varieties of mankind from a ſingle pair. Facts of this kind are of great value to the zoologiſt. How additionally ſingular would it be, if inſtances of the ſpontaneous diſappearance of this ſable mark of diſtinction between

* For an account of this curious caſe, ſee Med. and Chir. Review, vol. 5. p. 6.

 ſlaves

ſlaves and their maſters were to become frequent! They would then be no leſs important to the moraliſt and political economiſt.'

Formation of the Fixed Alkalies from an union of their elements during incineration. (Ibid.)

Kelp, or impure ſoda, is manufactured from the aſhes of certain maritime plants or ſea weed, the chief of which employed for this purpoſe are, the *fucus veſiculoſus, nodoſus, ſerratus,* and *digitalis,* Lin. But in order to afford kelp, theſe plants muſt be completely burned, and that in their ſound ſtate; for when they become putrid their produce of lixivial ſalt is but ſmall. It has been believed, that the ſoda obtained from theſe plants by burning, proceeds from the decompoſition of the ſea-ſalt, or muriate of ſoda, they contained before combuſtion. This, however, muſt be a miſtake; for though the *fuci* contain ſea-ſalt, it is in too trifling a quantity to account for the ſoda actually produced. This therefore muſt be formed from elementary combination taking place in the fire. But what is this combination? Perhaps the following facts will lead towards an anſwer to the queſtion. It is ſaid that carbon, if burned in *oxygenous* air, will be changed thereby to carbonic acid gas: alſo, that if carbon is burned in *atmoſpheric* air, that not only fixed air, but *potaſh* is formed. Now atmoſpheric air differs from oxygenous air by poſſeſſing or containing a portion of azotic or phlogiſticated air. From this latter combining with *ſomething elſe,* is the potaſh formed: the detection of this ſomething is the preſent object of reſearch. In the formation of *ammoniac* by diſtillation, Dr. *Woodhouſe* has ſhewn (ſee above) how largely the azotic part of the atmoſphere contributes to the formation of that alkali. The evidence ſeems quite as ſtrong in favour of the fixation of *azote* in ſoda and potaſh. The day is probably not far diſtant, when we ſhall be informed with which of the known ele-

ments,

ments, as carbon, lime, &c. it combines; or whether a new, and as yet unknown, element is concerned in the proceſs.*

Account of the Petroleum Wells in the Burmha Dominions. (*Aſiatic Res. vol.* 6.)

'In making a well, the hill is cut down ſo as to form a ſquare table of fourteen or twenty feet for the crown of the well, and from this table a road is formed, by ſcraping away an inclined plane for the drawers to deſcend, in raiſing the excavated earth from the well, and ſubſequently the ſoil. The ſhaft is ſunk of a ſquare form, and lined, as the miner proceeds, with ſquares of *caſſia* wood ſtaves; theſe ſtaves are about ſix feet long, ſix inches broad, and two thick; are rudely jointed and pinned at right angles to each other, forming a ſquare frame about four and a half feet in the clear for the uppermoſt ones, but more contracted below. When the miner has pierced ſix or more feet of the ſhaft, a ſeries of theſe ſquare frames are piled on each other, and regularly added to the top, the whole gradually ſinking, as he deepens the ſhaft, and ſecuring him againſt the falling in of the ſides.

"The ſoil or ſtrata to be pierced, is nearly ſuch as I have deſcribed the cliffs to be on the margin of the river, that is, firſt, a light ſandy loam intermixed with fragments of quartz, ſilex, &c.; ſecond, a friable ſand ſtone, eaſily wrought, with thin horizontal ſtrata of a concrete of martial ore, talc and indurated argile (the talc has this ſingularity, it is denticulated, its lamina being perpendicular to the horizontal lamina of the argile on which it is ſeated) at from ten or fifteen feet from the ſurface, and from each other, as there are ſeveral veins in the great body of free-ſtone. Thirdly, at ſeventy cubits, more or leſs, from the ſurface, and immediately below the free-ſtone, a pale blue argillaceous earth (ſchiſtous) impreg-

* See page 197 of the preſent volume on this ſubject.

impregnated with the petroleum, and ſmelling ſtrongly of it. This they ſay is very difficult to work, and grows harder as they get deeper, ending in ſhiſt or ſlate, ſuch as found covering veins of coal in Europe, &c. Below this ſhiſt, at the depth of about 130 cubits, is coal. I procured ſome, intermixed with ſulphur and pyrites, which had been taken from a well, deepened a few days before my arrival, but deemed amongſt them a rarity, the oil in general flowing at a ſmaller depth. They were piercing a new well when I was there, had got to the depth of eighty cubits, and expected oil at ten or twenty cubits more.

'The machinery uſed in drawing up the rubbiſh, and afterwards the oil from the well, is an axle croſſing the center of the well, reſting on two rude-forked ſtaunchions, with a revolving barrel on its center, like the nave of a wheel, in which is a ſcore for receiving the draw-rope; the bucket is of wicker-work, covered with dammer, and the labour of the drawers, in general three men, is facilitated by the deſcent of the inclined plane, as water is drawn from deep wells in the interior of *Hindoſtan.*

'To receive the oil, one man is ſtationed at the brink of the well, who empties the bucket into a channel made on the ſurface of the earth leading to a ſunk jar, from whence it is laded into ſmaller ones, and immediately carried down to the river, either by the coolies, or on hackeries.'

The oil is uſed for lamps, and as a preſervative of wood; its medicinal properties known to the natives are as a lotion in cutaneous eruptions, and an embrocation in bruiſes and rheumatic affections.

No. XLII.

THE

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REVIEW.

APRIL, 1801.

Art. LXXVI. *Three Lectures upon Animal Life, delivered in the Univerſity of Pennſylvania. By* Benjamin Rush, *M.D. Profeſſor of the Inſtitutes of Medicine, and of Clinical Practice in the ſaid Univerſity. Publiſhed at the Requeſt of his Pupils.* Octvo, 84 pages, Price 2s. 6d. Philadelphia, 1799. Imported by J. Mawman, London.

THE great importance of phyſiological ſtudies to the practical phyſician is very properly inſiſted on by Dr. *Ruſh* in the introduction to the work before us. Simple Anatomy, he obſerves, is a maſs of dead matter: it is Phyſiology which infuſes life into it. A knowledge of the ſtructure of the human body occupies only the memory: Phyſiology introduces it to the higher and more noble faculties of the mind. The component parts of the body may be compared to the materials of a houſe, lying without order in a yard: it is Phyſiology, which, like a ſkilful architect, connects them together, ſo as to form from them an elegant and uſeful building.

In the Lectures before us the author has not confined himself to the strict line laid down by writers in general on this subject, but treats of life in its relation to morals, metaphysics, and theology. They are, no doubt, as he remarks, intimately connected with the history of the faculties and operations of the human mind; and these form an essential part of the animal œconomy.

In animal life, as applied to the human body, Dr. *Rush* includes *motion*, *sensation*, and *thought*: these three when united compose perfect life. Life may exist without thought or sensation; but neither sensation nor thought can exist without motion. The lowest *grade* of life probably exists in the absence of even motion. Animal life is first considered as it appears in the waking and sleeping states in a healthy adult: he afterwards inquires into the modification of its causes in the fœtal, infant, youthful, and middle states of life; in certain diseases, in different states of society, in different climates, and in different animals.

The basis of the author's doctrine is founded in the three propositions following.—The reader will easily refer them to their source: the author, indeed, disclaims any title to originality.

1. Every part of the human body (the nails and hair excepted) is endowed with sensibility, or excitability, or with both of them; by the last is understood a capacity of imperceptible, as well as obvious motion.

2. The whole human body is so formed and connected, that impressions made in the healthy state upon one part, excite motion, sensation, or both, in every other part of the body. From this view it appears to be an unit, or a simple and indivisible quality, or substance.

3. *Life* is the *effect* of certain stimuli acting upon the sensibility, and excitability, which are extended in different degrees over every external and internal

part of the body. Theſe ſtimuli are as neceſſary to its exiſtence as air is to flame; animal life being truly a *forced* ſtate.

The author next proceeds to enumerate the various ſtimuli which act on the different organs. They have been divided into external and internal: the external are light, ſound, odours, air, heat, exerciſes, and the pleaſures of the ſenſes; the internal ſtimuli are food, drinks, chyle, the blood, a certain tenſion of the glands which contain ſecreted liquors, and the exerciſe of the faculties of the mind. Each of theſe is then treated of in order.

Life, the author obſerves, is in a languid ſtate in the morning. It acquires vigour by the gradual and ſucceſſive application of ſtimuli in the forenoon. It is in its moſt perfect ſtate about mid-day, and remains ſtationary for ſome hours. From the diminution of the ſenſibility and contractility of the ſyſtem to the action of impreſſions, it leſſens in the evening, and becomes again languid at bed time.

In the ſecond Lecture Dr. *Ruſh* proceeds to inquire into the different degrees and ſtates of Animal Life, but firſt premiſes the two following propoſitions: 1. The healthy ſtate of the body conſiſts in an exact proportion and due relation of excitement and excitability, diffuſed uniformly throughout the body: diſeaſe is the reverſe of this, depending on a diſproportion of theſe principles to each other, and in a partial diſtribution of each of them. 2. It is a law of the ſyſtem, that the abſence of one natural ſtimulus is generally ſupplied by the increaſed action of others.

The firſt departure from the ordinary and perfect ſtate of life noticed is *Sleep*. Natural ſleep, the author obſerves, is induced by a diminution of the excitement, and excitability of the ſyſtem by the continued application of the ſtimuli which act upon the body in its waking ſtate. Artificial ſleep may be induced at any time by certain ſtimulating ſubſtances, particularly by opium: theſe act by carrying the

 ſyſtem

ſyſtem beyond the healthy grade of excitement, to a degree of indirect debility, which Dr. Brown has happily called the ſleeping point.—To this ſtatement, we think, there is much objection. Without adverting to the notion that ſleep is a ſtate of diſeaſe, or a deviation from health, we may obſerve, that if ſleep were, as the author ſuppoſes, immediately the effect of a certain diminution of excitement and excitability, it ought to be in our power to induce it with great certainty, at almoſt any hour, by the proper regulation of ſtimuli; yet we know that this is not the caſe, it being exceedingly difficult, and often impoſſible to induce ſleep at unuſual hours, whatever degree of fatigue be brought on the ſyſtem. Nor is the operation of opium to be referred ſimply to a ſtimulating power, for other ſtimuli produce no ſuch effects. The ſimple law referred to appears very inadequate to explain the various and complicated functions of the animal œconomy.

The ſtimuli which the author ſuppoſes to act with increaſed force upon the body in ſleep, are, the accumulated heat of the body; the air which is reſpired, and which he thinks acts with more force than in the waking ſtate, *inducing more forcible action of the muſcles of reſpiration, and increaſed impetus of the blood through the heart and blood-veſſels*; the preſence of aliment in the ſtomach, *digeſtion going on more rapidly when we are awake than when we ſleep*; the preſence of the urine and fœces in the bladder and inteſtines; and the mental exertion in dreams—Many of the aſſumptions here appear to be queſtionable.

The next ſtate of life treated of is that of *Infancy*. In this there is a deficiency of many of the ſtimuli which ſupport life; but this is ſupplied by the increaſed excitability of the ſyſtem to other ſtimuli, as light, ſound, heat, and air. The capacity of infants to be acted upon by moderate degrees of heat is evident, the author obſerves, from their ſuffering leſs from

from cold than grown people [is this really the cafe?]; and he quotes an inftance of a child that was found alive on the back of its mother in Hudfon's Bay, after fhe was frozen to death. Other ftimuli by which animal life is fupported in infants are, frequent fucking and feeding, laughing and crying, exercife of the limbs, dreams, and the effects of novelty in the frequent contemplation of new objects. Crying, it is obferved, has a confiderable influence upon health and life in children; the author has feen fo many inftances of its falutary effects, that he has fatisfied himfelf that it is as poffible for a child to "cry and be fat," as it is to "laugh and be fat."

In youth and in middle age life is in its moft perfect ftate. In old age many of the fenfes are impaired; the deficiency, however, is fupplied,—' 1. By an increafe in the quantity, and by the peculiar quality of the food which is taken by old people. They generally eat twice as much as perfons in middle life, and they bear with pain the ufual intervals between meals. They moreover prefer that kind of food which is favoury and ftimulating. The ftomach of the celebrated *Parr*, who died in the one hundred and fiftieth year of his age, was found full of ftrong nourifhing aliment.

' 2. By the ftimulus of the fœces, which are frequently retained for five or fix days in the bowels of old people.

' 3. By the ftimulus of fluids rendered preternaturally acrid by age. The urine, fweat, and even the tears of old people, poffefs a peculiar acrimony. Their blood likewife lofes part of the mildnefs which is natural to that fluid; and hence the difficulty with which fores heal in old people; and hence, too, the reafon why cancers are more commonly found in the decline, than in any other period of human life.

' 4. By the uncommon activity of certain paffions. Thefe are either good or evil. To the former belong an increafed vigor in the operations of thofe paffions

which have for their objects the Divine Being, or the whole family of mankind, or their own offspring, particularly their grand-children. To the latter passions belong malice, a hatred of the manners and fashions of the rising generation, and, above all, avarice. This passion knows no holidays. Its stimulus is constant, though varied daily by the numerous means which it has discovered of increasing, securing, and perpetuating property. It has been observed that weak mental impressions produce much greater effects in old people than in persons of middle life. A trifling indisposition in a grand-child, an inadvertent act of unkindness from a friend, or the fear of losing a few shillings, have, in many instances, produced in them a degree of wakefulness that has continued for two or three nights. It is to this highly excitable state of the system that Solomon probably alludes, when he describes the grasshopper as burdensome to old people.

5. By the passion for talking, which is so common, as to be one of the characteristics of old age. I mentioned formerly, the influence of this stimulus upon animal life.—Perhaps it is more necessary in the female constitution than in the male; for it has been long ago remarked, that women who are very taciturn, are generally unhealthy.

'6. By their wearing warmer clothes, and preferring warmer rooms, than in the former periods of their lives. This practice is so uniform, that it would not be difficult in many cases to tell a man's age by his dress, or by finding out in what degree of heat he found himself comfortable in a close room.

7. By dreams. These are universal among old people. They arise from their short and imperfect sleep.

'8. It has often been said, that "we are once men, and twice children." In speaking of the state of animal life in infancy, I remarked that the contractility of the animal fibres predominated over their sensibility in that stage of life. The same thing takes place in old people,

people, and it is in conſequence of the return of this infantile ſtate of the ſyſtem, that all the ſtimuli which have been mentioned act upon them with much more force than in middle life. This ſameneſs, in the predominance of excitability in children and old people, will account for the ſimilarity of their habits with reſpect to eating, ſleep, exerciſe, and the uſe of fermented or diſtilled liquors. It is from the increaſe of excitability in old people that ſo ſmall a quantity of ſtrong drink intoxicates them; and it is from an ignorance of this change in their conſtitutions, that many of them become drunkards after paſſing the early and middle ſtages of life with ſober characters.'

In certain morbid ſtates when the ſtimuli are deficient, as where perſons are born blind, or deaf, the deficiency is ſupplied by increaſed ſenſibility and excitement in their remaining ſenſes, and by an increaſe of vigor in the exerciſes of the mental faculties: in idiots, by an inordinate appetite for food or venereal pleaſures. When perſons paſs many days, or even weeks, without food or drinks, life is ſupported either by the ſtimulus of diſeaſe; or, where the abſtinence is voluntary, as from religious motives, or neceſſary from want, the abſence of food is ſupplied by the ſtimulus of a full gall-bladder; by increaſed acrimony in all the ſecretions and excretions; by increaſed ſenſibility and excitability in the ſenſe of touch; and by an increaſe of activity in the underſtanding and paſſions. In caſes of ſuſpended animation, life is reſtored by the action of ſtimuli on the accumlated excitability of the ſyſtem.

In the third Lecture the author enters into the conſideration of the ſtate of Animal Life in the different inhabitants of the globe, as varied by the circumſtances of civilization, diet, ſituation, and climate. The defect of the ſtimulus of aliment, and of the underſtanding and paſſions in the Indians of the northern latitudes of America, is ſupplied, in part, by the violent exertions

 with

with which they hunt, and carry on war, and by the extravagant manner with which they afterwards celebrate their exploits in their savage dances and songs. In the inhabitants of the torrid zone, there is a deficiency of labour, as well as of the understanding and passions. This is amply supplied by the constant heat of the sun, by the profuse use of spices in their diet, and by the passion for musical sounds which so universally characterizes the African nations.

In Greenland, where the body is exposed to extreme cold, the effects of this in lessening the quantity of life are obviated in part by the heat of close stove rooms, by warm clothing, and by the peculiar nature of the aliment of the Greenlanders, which consists chiefly of animal food, of dried fish, and of rancid whale oil. It is remarkable that the food of all the northern nations of Europe is composed of stimulating animal or vegetable matters, and that the use of spirituous liquors is universal amongst them. In the miserable inhabitants of the Ottoman Empire, where tyranny renders torpid all the faculties, the deficiency of aliment and the absence of mental stimuli are supplied by the heat of the climate; by their passion for musical sounds and fine clothes; and by their general use of coffee and opium. The same observations apply, in great measure, to the inhabitants of China and the East Indies, who accustom themselves to the use of tea, and a stimulating coffee made of the dried and toasted seeds of the *datura stramonium*, and also to the chewing of stimulating substances.

'Among the poor and depressed subjects of the governments of the middle and southern parts of Europe, the deficiency of the stimulus of wholesome food, of clothing, of fuel, and of liberty, is supplied in some countries by the invigorating influence of the Christian religion upon animal life; and, in others, by the general use of tea, coffee, garlic, onions, opium, tobacco, malt liquors, and ardent spirits. The use of each of these stimuli seems to be regulated by the circumstances of climate. In cold countries,

where

where the earth yields its increafe with reluctance, and where vegetable aliment is fcarce, the want of the ftimulus of diftention which that fpecies of food is principally calculated to produce, is fought for in that of ardent fpirits. To the fouthward of 40° a fubftitute for the diftention from mild vegetable food is fought for in onions, garlic, and tobacco. But, further, a uniform climate calls for more of thefe artificial ftimuli than a climate that is expofed to the alternate action of heat and cold, winds and calms, and of wet and dry weather. Savages and ignorant people, likewife, require more of them than perfons of civilized manners and cultivated underftandings. It would feem from thefe facts that man cannot exift without *fenfation* of fome kind, and that, when it is not derived from natural means, it will always be fought for in fuch as are artificial.

'In no part of the human fpecies, is animal life in a more perfect ftate than in the inhabitants of Great Britain, and the United States of America. With all the natural ftimuli that have been mentioned, they are conftantly under the invigorating influence of liberty. There is an indiffoluble union between moral, political, and phyfical happinefs; and if it be true, that elective and reprefentative governments are moft favourable to individuals, as well as national profperity, it follows, of courfe, that they are moft favourable to animal life. But this opinion does not reft upon an induction derived from the relation which truths upon all fubjects bear to each other. Many facts prove animal life to exift in a larger quantity and for a longer time in the enlightened and happy ftate of Connecticut, in which republican liberty has exifted above one hundred and fifty years, than in any other country upon the furface of the globe.'

The author next adverts to certain mental ftimuli, which act nearly alike in the production of animal life, upon the individuals of all nations: thefe are the defire of

of life; avarice, or the love of money; public amusements; the love of drefs; novelty; the love of fame; patriotifm, or the love of one's country; and religion. Refpecting the defire of life, the author obferves, 'That this principle, fo deeply and univerfally implanted in human nature, acts very powerfully in fupporting our exiftence. It has been obferved to prolong life. Sickly travellers, by fea and land, often live under the circumftances of the greateft weaknefs, till they reach their native country, and then expire in the bofom of their friends. This defire of life often turns the fcale in favor of a recovery in acute difeafes. Its influence will appear, from the difference in the periods in which death was induced in two perfons, who were actuated by oppofite paffions with refpect to life. Atticus, we are told, died of voluntary abftinence from food in five days. In Sir William Hamilton's account of the earthquake at Calabria, we read of a girl who lived eleven days without food before fhe expired. In the former cafe, life was fhortened by an averfion from it; in the latter, it was protracted by the defire of it. The late Mr. Briffot, in his vifit to this city, informed me, that the application of animal magnetifm (in which he was a believer) had in no inftance cured a difeafe in a Weft India flave. Perhaps it was rendered inert by its not being accompanied by a ftrong defire of life; for this principle exifts in a more feeble ftate in flaves than in freemen. It is poffible, likewife, the wills and imaginations of thefe degraded people may have become fo paralytic by flavery, as to be incapable of being excited by the impreffion of this fanciful remedy.'

The author now proceeds to take a view of life in animals of different fpecies, and endeavours to fhew that it depends upon the fame caufes as in the human body; nor does he exclude vegetables from being fubject to the fame general law of being acted upon by ftimuli in the manner of animals. The work concludes

concludes with a brief application of the doctrines it contains to medicine, metaphyfics, theology, and morals.

The view of life here given has frequently been objected to; nor have any of the difficulties which attend the fubject been removed by it. The author confiders life as the *effect* of certain ftimuli acting upon the fenfibility and excitability of the body. It would be more philofophical to fay, that animal motion, or action, is the effect of ftimuli acting on the excitability. The difpofition to be acted on by ftimuli is the proper characteriftic of living beings; this property it is which fhould be called *life*, though the author, after Dr. Brown, choofes to call it excitability. The excitability of the fyftem is its *life*, and what peculiarly diftinguifhes it from inanimate matter: *action*, or *motion*, the effect of ftimuli on the excitability, is a *mode* of life only. This the author himfelf allows, when he fays, p. 5. "that the loweft grade of life probably confifts in the abfence of even motion;" —and again, p. 72, "that it is poffible life may exift in thefe animals (viz. fuch as are torpid in winter), during their hibernation, in the total abfence of impreffion and motion of every kind." In this cafe, if life exifts at all, it exifts in the *capacity* of being acted upon by ftimuli; in a word, it is *excitability* merely. There appears, therefore, no foundation for faying that life is a *forced* ftate: the living actions are undoubtedly fo, for they are always the effect of impreffions. *Excitability*, or *Life*, is an inherent property of living bodies; but what is its nature or effence, whether it exifts as matter, as fpirit, or as the effect of organization merely, we are altogether ignorant: it matters little whether we call it *excitability*, the *living principle*, the *fpirit of animation*, or *the vital energy*; it is equally well expreffed by either. In abandoning the doctrine, that life is a *forced ftate*, Dr. Cullen was, no doubt, determined by a conviction of its infufficiency. Dr. Rufh, however,

ever, boasts of never having deserted it; and observes, that the belief of it has been the foundation of many of the principles and modes of practice in medicine which he has since adopted.

In a practical view we cannot see how the doctrine here inculcated tends at all to facilitate our knowledge of the causes of all diseases, or their cure. "Diseases," the author observes, p. 78, "consist in excessive, or preternatural excitement in the whole, or a part of the human body, accompanied *generally with irregular motions*, and induced by natural or artificial stimuli: and the cure of them depends simply upon the abstraction of stimuli from the whole, or from a part of the body, when the motions excited by them are in excess; and in the increase of their number and force, when motions are of a moderate nature. For the former purpose we employ a class of medicines known by the name of *sedatives*; for the latter we make use of stimulants. Under these two extensive heads are included all the numerous articles of the Materia Medica."—This view of the matter, we fear, has more of *simplicity* than truth to recommend it. It is the *irregular motions* alluded to in the passage above quoted, as *generally* accompanying disease, which renders difficult the practice of physic; as they are subject to other laws than those which apply to excitability simply. Excitability is not the same thing in different systems, or in different parts of the same system. It is different in the muscles, in the nerves, and in the various organs, and governed by different laws. The effects of medical agents, or stimuli, if the term is preferred, can never be with certainty predicted; for the susceptibility of different systems, and of the same system at different times, is infinitely varied, and not cognizable by any external signs. Medicine, therefore, must ever be an experimental art, and one of great difficulty. Nothing can be gained by sacrificing truth to simplicity.

ART.

Art. LXXVII. *Practical Obſervations on the Cure of the Gonorrhœa Virulenta in Men. By* Thomas Whately, *Member of the Royal College of Surgeons in London.* Octavo, 119 pages, price 2s. 6d. London, 1801. Johnson.

A GREAT number of Treatiſes have appeared, at different times, on Lues Venerea, and its various forms; yet we have no reaſon to ſuppoſe the ſubject to be exhauſted, or the beſt poſſible treatment to have been aſcertained. The contradictory opinions of writers, indeed, on this point, are a proof of the contrary. Whilſt one truſts the cure of Gonorrhoea wholly to topical applications, and thinks any attention thrown away that is paid to the conſtitution, another ſees nothing but danger and miſchief in the uſe of aſtringent injections, and raves at the boldneſs and temerity of his cotemporaries in uſing them. The author of the Eſſay before us has choſen the middle path, and ſeems to have been guided in his opinions by obſervation and experience.

In the firſt chapter, Mr. *Whately* treats of the nature of the poiſon in Gonorrhœa Virulenta, and endeavours to prove, what few practitioners of obſervation now doubt, the ſameneſs of the poiſon in this and in lues venerea. He next inquires into the ſeat of the diſeaſe in men, and points out its appearances in the urethra. He ſuppoſes ulceration in this canal to take place more frequently than has of late been imagined. Where the orifice of the urethra is naturally wide, he has ſeveral times, he obſerves, diſtinctly ſeen ulcers, both a little within, and at the extremity of this canal. The preſence of ulceration, he thinks, is pointed out by the great hardneſs of the part, as felt externally (far exceeding that which would ariſe from an inflamed mucous gland); by the violence of the inflammation and the diſcharge; and by the diſeaſe not yielding to any remedy but mercury given internally, or uſed in frictions.

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The third chapter treats of the difference between the poiſon of the gonorrhœa virulenta, and that of the lues venerea. The object of this is to prove, that the matter of gonorrhœa, as well as of the other primary affections, chancre and bubo, though partaking of the ſame ſpecific property as that of the ſecondary ulcers, yet differs conſiderably in its degree of virulence or activity; and hence he accounts for the more difficult cure of the former, and their requiring a more plentiful adminiſtration of the remedy.

Chapter 4 points out the treatment of gonorrhœa virulenta in men. The diſeaſe is divided into three different ſpecies:——

Firſt, The gonorrhœa attended with ulcer in the urethra, or with a conſiderable induration of the lips of its orifice, and of a portion of the corpus ſpongioſum adjoining, but without any apparent ulcer. Theſe appearances being for the moſt part attended with a chordee, and ardor urinæ, to a greater or leſs degree.

Secondly, The gonorrhœa attended with a chordee and ardor urinæ, with other marks of a conſiderable inflammatory affection of the urethra and penis, but without any appearance of ulcer, or great induration of the lips of the orifice of the urethra, or of the corpus ſpongioſum.

Thirdly, The gonorrhœa unattended with any of theſe circumſtances, its chief ſymptom being a ſmall purulent diſcharge from the urethra.

In the two firſt ſpecies the uſe of mercury is ſtrongly inſiſted upon. On this head the following remarks occur:—

'Whenever ulcer or chancres take place in the urethra in the firſt ſpecies, whether they be large or ſmall, or with or without a ſurrounding hardneſs, or whenever a conſiderable induration is met with in the ſubſtance of the urethra, near its extremity, even though it be not attended with apparent chancres, all practitioners agree in the propriety of curing them by mercury, exhibited internally,

internally, in the ſame manner as if the complaints were ſituate in any of the external parts of the penis.

'In all gonorrhœas of the ſecond ſpecies, we have reaſon to conclude, from the obſervations already made, that the poiſon has penetrated into, and excoriated the inner membrane of the urethra to ſome depth, though it may not have produced actual ulcers in it. If in theſe caſes mercury be exhibited internally, or in frictions, in proper doſes, it will now and then make a perfect cure of the diſeaſe in a very ſhort time. In general, however, it muſt be confeſſed, that mercury, thus given, will not effect a complete cure. But I can confidently aſſert, that it will, in almoſt every caſe, remove the chordee, and ardor urinæ. It will likewiſe, in a very conſiderable degree, leſſen the quantity of the uſual diſcharge, and alter its colour and conſiſtence from a deep yellow or greeniſh thin pus to that of a whitiſh yellow of a thicker conſiſtency.

'The exhibition of mercury for the cure of chancres, in the firſt ſpecies of the diſeaſe, will alſo alleviate all the other ſymptoms attending that ſpecies, to the ſame degree as when it is exhibited for the removal of theſe affections in the ſecond ſpecies.

'It has been already obſerved, that a majority out of any given number of caſes of chancres, treated only by mercury given internally, would require an affection of the mouth to be produced by it, before the ſores would yield to this method of treatment. It is exactly the ſame in the ſecond ſpecies of gonorrhœa: yet it is impoſſible to fix the preciſe quantity of mercury which ought to be uſed for each individual, or the degree of affection which ſhould be produced by it on the mouth, in order to accompliſh its deſign. This muſt vary conſiderably in different habits, and in different caſes. In ſome few inſtances, indeed, this gonorrhœa will be benefited to the ſame extent, by alterative doſes of mercury, as when an affection of the mouth

mouth is produced by it: an effect fimilar to what has been already mentioned concerning the power of this remedy in the cure of fome chancres. From thefe circumftances, it will be found in practice, that nearly an equal number of all thefe gonorrhœas will, in their fymptoms, yield to mercury, in the manner already defcribed, with as much certainty as may be expected in a like number of chancres.

'From this ftatement it appears, that, if we be to expect good effects in thefe gonorrhœas, we muft give it in the fame manner, and in the fame dofes, as would be neceffary to cure recent chancres.'

In his account of the effects of mercury on the difeafe, the author is a little inconfiftent with himfelf: in one part he obferves, page 47, 'that the relief obtained was entirely owing to the abforption of mercury into the circulation, and its *immediate action on the venereal virus;*' and immediately afterwards talks of 'exciting a fufficient degree of mercurial action in the habit.' Mercury either cures, by chemically combining with, and deftroying the venereal virus; or, which is the more probable fuppofition, it excites in the fyftem a peculiar action, under which the impreffion of the poifon is no longer felt. The two ideas certainly fhould not be confounded together.

When a gonorrhœa of the firft or fecond fpecies is brought into the ftate here defcribed by the exhibition of mercury internally, the urethra appears to be affected by the poifon nearly in a fimilar manner to what it is in the third fpecies of the difeafe, and requires peculiar local treatment by injection. This forms the fubject of the fifth chapter.

In the compofition of injections, a decided preference is given to mercurial preparations, on the ground of their acting as a topical fpecific on the virus. The mercurial which the author principally employs is the muriated quickfilver, or corrofive fublimate. This is diffolved in rectified fpirit, in the proportion of a drachm

drachm of the ſalt to an ounce of the ſpirit. Of this ſolution two drops are added to four ounces of rain or diſtilled water, and the injection thus prepared is directed to be uſed thrice a day only for the firſt week, and afterwards four or five times a-day. This, the author obſerves, will, in almoſt every caſe, produce an immediate amendment. It will abate the inflammation, leſſen the diſcharge, and, if there be any degree of ardor urinæ or chordee, it will very generally remove theſe ſymptoms in a ſhort time.

If, after uſing this injection for a week or ten days, the diſeaſe has not decreaſed for the laſt three or four days, it will be adviſable to adminiſter a ſtronger one. For this purpoſe, four drops of the ſolution above deſcribed are to be uſed in four ounces of water, increaſing the quantity of the remedy, as circumſtances may require, by two drops at a time, whenever an augmentation of its power is obviouſly neceſſary. If calomel be preferred to the corroſive ſublimate, ten grains is the quantity adviſed to three ounces of water, and one ounce of mucilage of gum-arabic, increaſing the quantity of calomel gradually, as may be requiſite, to ſixty grains in four ounces of the menſtruum.

Chapter 6.—*Of the Cure of the Gonorrhœa of the ſecond Species by Injection only.* When circumſtances forbid the uſe of mercury in this ſpecies of the diſeaſe, injections muſt be had recourſe to: the cure, however, the author obſerves, ſhould be firſt begun with abating the inflammatory ſymptoms by the uſual antiphlogiſtic remedies. When this has been effected, injections may be properly employed; and for this purpoſe an almoſt excluſive preference is given to the mercurial preparation before deſcribed. Reſpecting the white vitriol, Mr. *Whately* remarks, that he has for many years been very attentive to its effects in a great variety of caſes, both of the ſecond and third ſpecies of gonorrhœa; and is of opinion, that it will in no caſe whatever make a perfect cure of a virulent gonorrhœa of the ſecond ſpecies: and not only this, but he con-

ſiders it a dangerous remedy, and altogether unſuited to eradicate the venereal poiſon. It occaſions, he obſerves, incurable gleets and obſtinate ſtrictures; in ſhort, he is convinced, that no remedy which has been uſed for the cure of any complaint, ſince the time of *Hippocrates*, has done *more* miſchief than this and other aſtringent injections in the worſt kinds of gonorrhœas. Even in the third ſpecies of the diſeaſe, he has been equally diſappointed, having never ſucceeded in making a complete cure with it, except in a very few inſtances, in which the diſeaſe perhaps did not originate from the venereal poiſon, but from ſimple irritation.

In the ſeventh and laſt chapter, the author treats in a brief way of *Venereal Gleets*, that is, ſuch as follow recent gonorrhœas, and which in fact he conſiders as gonorrhœas imperfectly cured. In this caſe, he obſerves, it ſhould always be remembered, that however ſmall the diſcharge may be (provided it be of a yellow purulent kind), it is not leſs infectious than on the firſt day the diſeaſe was contracted. In a note ſubjoined, however, it is allowed, that there are gleets of a yellow colour, having all the appearances of pus, which are not of an infectious nature. The means of diſtinction are not pointed out.

The method of cure in the venereal gleet muſt be nearly the ſame as in the recent gonorrhœa. If there is reaſon to ſuſpect that there is a ſmall lurking chancre in the urethra, or that this part is excoriated by the poiſon, to ſuch a depth as not to be eaſily healed by the action of the injection, the internal uſe of mercury ſhould be reſorted to, as in the gonorrhœa of the ſecond ſpecies; finiſhing the courſe, if any diſcharge remain, by mercurial injections. In obſtinate caſes, the bark, cold or ſea bathing, and country air, are adviſed, to aſſiſt the intention of injections.

Art.

Art. LXXVIII. *An Essay to elucidate the Nature, Origin, and Connexion of Scrophula and Glandular Consumption; including a brief History of the Effects of* Ilkley Spaw. *With Observations on the Medicinal Powers of the Digitalis; and Strictures on the Opinions of Dr.* Lettsom, *relative to the Virtues of that Plant. By* George Mossman, *M. D.* Octavo, 106 pages, price 2s. 6d. London, 1800. Johnson.

THE professed intention of the author of the present Essay is, to exhibit brief histories of the phenomena of Scrophula and Glandular Consumption; to establish an analogy between the *Scrophulous* and *Consumptive* habits; and to bring into view some of the most popular medicines in the cure of both diseases, and to appretiate their several powers. The connexion between scrophula and consumption, it may be observed, is no new idea, but has been long and frequently remarked. All the later writers on the latter disease have noticed it, and have in some degree founded their mode of cure on this supposition. Daily experience, indeed, shews us, that persons who, in the earlier stages of life, suffer from the attacks of scrophula, fall the most frequent victims to phthisis pulmonalis at a later period. Little, however, seems hitherto to have been gained by tracing this fatal affection to the source mentioned; for neither the nature nor treatment of scrophula are sufficiently known to enable us to guard the habit from its assault; nor has the cure of tubercular consumption been materially improved by reference to its supposed origin.

Dr. *Cullen*'s definition of scrophula, though the most minute, appears to the author the most exceptionable of any that has been given. The "*tumidum abdomen*," he observes, is seldom apparent where scrophula presents itself in its usual form, unconnected with other diseases; whilst the "*labium superius et*

 columna

columna nafi tumida" are by no means frequent occurrences. Few practitioners, we prefume, will agree with the author in this fentiment, or will be ready to call in queftion the accuracy of Dr. *Cullen's* obfervation, notwithftanding he informs us, 'that, during the laft twelve years, he has feen and prefcribed to as many fcrophulous patients as the late refpectable profeffor did, during a practice of fifty' ———. The definition of fcrophula given by *Linnæus* appears to the author the moft correct, though perhaps not fufficiently comprehenfive, viz. "*Glandula infarcta, nodus indolens, folidiusculus, preffione obtufe fentiens.*" This is no doubt highly defcriptive of one fymptom of the difeafe; and the fame may be faid of the definitions objected to.

From confidering the habits peculiarly fufceptible of fcrophula, the author is convinced that the difeafe confifts in a *relaxed ftate of the fyftem*, and a morbid affection of the glands referrible to this fource. *Debility* and *obftruction*, he thinks, ftand to each other in the relation of caufe and effect, and are explanatory of every future form of the difeafe. Much pains are taken to prove that fcrophula is not *hereditary*; that is, is not tranfmitted from parent to child by a vitiated ftate of fluids: they might, however, have been fpared, as it is *hereditary predifpofition* only that is now contended for amongft practitioners. It were well that the affertion of the author were generally true, 'that its approach may be very generally counteracted by the means beft calculated to obviate debility.' We are not fo fanguine.

The author properly cautions us againft confounding fcrophulous affection of the mefentery with *worms*, a miftake, there is reafon to fuppofe, too frequently made. The diftinction is thus pointed out.

'If the *myfentery* * be the feat of *fcrophula*, the fame general procefs to fuppuration, with fymptoms a little diverfified, takes place. In this defeafe there is

* The orthography adopted by the author on all occafions in the words myfentery and defeafe, look a little like affectation.

often

often a perceptible hardneſs, and inequality of the abdomen, accompanied by a dull obtuſe pain upon preſſure. The ſame phænomena of *ſymptomatic fever* are exhibited here, as in the other diverſities of *ſcrophula*; and from the contiguity of the parts affected, a ſympathetic ſtimulus is communicated to the inteſtinal canal, which either induces a tendency to, or very frequently excites a continued *diarrhœa.*—I have known miſtakes of much ſerioufneſs committed by aſcribing to the preſence of *worms* confirmed caſes of myſenteric conſumption. One melancholy inſtance of this kind I ſhall ever painfully remember. A few years ago an amiable young lady laboured under ſymptoms which I conceived to ariſe from a *deſeaſed myſentery.* I adviſed the means which I deemed likely to afford relief. Another phyſician was conſulted. Under ſome unavailing diſcuſſion of the characteriſtic ſymptoms of affections of the *myſentery*, and of the preſence of *worms*, I was over-ruled,—and it was concluded that all her complaints were referrible to the exiſtence of the latter deſeaſe; *worm medicines* were accordingly adminiſtered; the diſtreſſing *diarrhœa* under which the lovely ſufferer had long laboured, was much exaggerated, and ſhe ſoon afterwards ſunk into everlaſting repoſe. A ſubſequent diſſection ſhewed the *myſentery* in a ſtate of deſeaſe.

'The impreſſion which this caſe made upon my mind has induced me to examine, with much anxiety, into thoſe minute circumſtances which may lead to a diſcrimination between an affection of the *myſentery* and the preſence of *worms*. This is a deciſion of much importance. Nor do I preſume to put the matter beyond all doubts. It is with much diffidence that I detail the reſult of my own obſervations. I believe that it very generally happens, when the *myſentery* is in a morbid ſtate, that we meet with *glandular obſtructions* in other parts of the body, or with ſymptoms ſtrongly indicative of a *ſcrophulous habit.* I have obſerved an enlargement of the abdomen both in *myſenteric af-*

 fections

fections and in caſes of *worms*; but in the former deſeaſe I have obſerved an inequality of the ſurface of the abdomen perceptible, and very often painful, to the touch. In *worm caſes*, the appetite is ſometimes diminiſhed, but more frequently voraciouſly encreaſed; in *myſenteric affections*, the appetite, though not uniform, does not exhibit any very ſtriking variation. In the latter deſeaſe I have obſerved a regular, well-marked, debilitating *ſymptomatic fever*; in the former deſeaſe, if *fever* makes its approach, it aſſumes the type of a *fever* ariſing from cold, dentition, or any cauſe productive of irritability. In both deſeaſes there is much irregularity in the ſtate of the bowels; but where there is a morbid affection of the *myſentery* the tendency to *diarrhœa* is more conſtant than from the preſence of *worms*:---the nature and colour of the evacuations, too, are widely different;---in *myſenteric caſes*, from the aliment mixing with the natural mucus, and from the *lacteal veſſels* being rendered incapable of abſorbing this combination, much of the nutritious part of the food is paſſed off, and for the moſt part exhibits fœces of a pale clay colour; the alvine diſcharge in *worm caſes* is very variable in point of colour, and is very generally ſlimy. In caſes of *a morbid affection of the myſentery*, the urine is almoſt conſtantly high coloured: in *worm caſes* it is often limpid, and frequently approaches to white.—— Dr. *Home* has obſerved, that a ſwelling of the *alæ narium* and upper lip is a certain diagnoſtic of *worms*; and I am of opinion, that if thoſe appearances be combined with ſome of the other prominent ſymptoms, they will infallibly prove the preſence of this deſeaſe. In *myſenteric conſumption* there is an undeſcribable anguiſh apparent in the countenance; in caſes of *worms* the viſage is heavy and dull, and there is preſent that general liſtleſſneſs of frame, and a want of that ſprightlineſs of face ſo natural to children.'

Previous to treating of the means to be employed for the cure of ſcrophula, when properly formed, the author

author makes fome obfervations on the methods of obviating the predifpofing caufe, weaknefs, in children. Proper food, air, and exercife, are the points chiefly infifted on. *Bathing* is alfo ftrongly recommended for the fame purpofe, from the higheft degree of heat proper, down to the ufual temperature of elementary water, according to the judgment of the prefcriber. The author here fhould have been more particular with regard to the temperature of the bath he recommends, as we are left in the dark whether he gives the preference to the cold, temperate, or hot bath; remedies very different in their effects on the fyftem. In the *obftructive* ftage of fcrophula the author has employed calomel, antimony, digitalis, hemlock, opium, coltsfoot, fteel, muriated barytes, nitrous acid, burnt fponge, bathing, &c. &c. His fuccefs with thefe is thus ftated :—

'In recent cafes of *obftruction*, I have adminiftered fmall dofes of *calomel*; and when there appears in the gland a tendency to inflammation, I have employed, I think, with advantage, *calomel* and *tartarized antimony*;—during the future progrefs of the defeafe, when there is much irritation, or when there are deep-feated affections of the joints, I have feen beneficial effects produced by the addition of *opium*.—In every ftage of the defeafe I regulate the action of the heart by the fedative powers of *digitalis*. I have exhibited *hemlock* in every form of *fcrophula*; and although I have kept my patients under its influence for feveral months, fo as to be able to give it in enormous dofes, yet I never faw it effect the leaft alleviation of the fymptoms. I am now completely fatisfied of the correctnefs of this fact:—my opinion upon the fubject, however, was formed with caution, in as much as *hemlock* ftood highly recommended by characters of much profeffional celebrity.—I have alfo adminiftered *muriated barytes*, and the *nitrous acid*;—they will be found to encreafe the appetite, and to impart vigour to

the fyftem; but I never faw them exhibit any ftrikingly beneficial effect on the morbid glands.'

But of all the remedies he has tried for fcrophula, immerfion in water claims the firft place. The waters of *Ilkley Spaw*, in Yorkfhire, are particularly fpoken of, as in high repute in the neighbourhood where they are fituated for the cure of fcrophulous affections. On examination, this water appeared remarkably free from foreign impregnation of every kind, and its falutary qualities, the author thinks, refide exclufively in the remarkable coldnefs, foftnefs, and purity of the element, by which it is calculated to enter thofe minute veffels of the animal frame which are impervious to other fluids.

When fuppuration has taken place, and the matter has been difcharged, 'the irritability of the habit, and the encreafe of vafcular action, muft be obviated by keeping the fyftem ftrictly under the influence of *digitalis*: and in addition to this practice, I would recommend,' the author obferves, 'the bark of the cinchona in large and repeated dofes:—I have alfo given the *muriated barytes*, and I have uniformly enjoined the ufe of the temperate, or cold bath.'

The author comes now to the treatment of *Confumption*. Tubercles in the Lungs he conceives to be the general caufe of this difeafe; and were it practicable to attack a tubercle locally, he would treat it in the fame manner as he would a morbid gland fituated in any part of the fyftem. If medical aid were folicited at an early period, he would advife, as in the primary ftage of *fcrophula*, the ufe of refolvent remedies.—It feems to us that the author is here more guided by his previous notions of the nature of the difeafe than by experience. Practitioners who have made trial of *refolvent remedies*, as mercurials and the like, in pulmonary confumption, are almoft unanimous in condemning them. The repeated application of blifters to the thorax is favourably fpoken of; as is the ufe

uſe of light animal food. A cordial regimen, however, by which, we ſuppoſe, the author means the uſe of ſtimulants and fermented liquors, is properly prohibited. Horſe exerciſe, in oppoſition to the ſentiment of *Sydenham*, is decidedly condemned. *Muriated barytes* and the *nitrous acid* are ſaid to be excellent auxiliaries in the cure of conſumption, quenching thirſt, and giving tone to the ſtomach, without increaſing the velocity of the circulation.

With reſpect to other remedies for Conſumption, the author obſerves that he has been wholly diſappointed in their uſe, deriving from them no permanent or material advantage. The digitalis, however, is an exception, and is ſpoken of in a ſtrain of high eulogium. No notice, however, is taken of thoſe who have the merit of recalling it into practice as an antiphthiſical remedy. Its virtues and mode of action are thus detailed:—

'The virtue of the *digitalis* (which certainly approximates to a ſpecific, in the primary ſtages of *Conſumption*) is, in my opinion, to be aſcribed excluſively to its dominion over the heart. If the tranſmiſſion of the blood through the lungs be performed with only half its morbid velocity, I expect that the ſecretion from that organ will be proportionably leſſened,—that the dyſpnœa and cough will conſequently be diminiſhed; and that whatever be the cauſe of the ſymptomatic fever, it will be effectually ſubdued,—and, of courſe, the debilitating diſcharges attached to it will be rendered unneceſſary.

'I am perſwaded that the digitalis poſſeſſes in itſelf a power *directly ſedative*, and that the application of this power, by leſſening the irritability of the muſcular fibre, will explain its ſalutary operation in the cure of *Pulmonary Conſumption.*

'It has been obſerved that *collections of water* diſappeared, during the exhibition of the *digitalis*, and without any extraordinary flow of urine. I apprehend that an explanation of this fact will be attended with conſiderable

conſiderable difficulty; for I believe it to be queſtionable, if not incorrect reaſoning, to contend that there exiſts a power which can at the ſame time diminiſh the action of one ſyſtem of veſſels, and encreaſe that of another.—The operation of the *digitalis* very certainly leſſens the ſecretion by the *exhalent arteries;* but whether it affects the ſyſtem of *abſorbents* otherwiſe than by intercepting the further ſupply of fluid, and leaving them at liberty to take up what is already poured out, demands, I think, a doubt. The *abſorbent veſſels*, and their range of action, are perhaps not ſufficiently well underſtood; but we know that their powers are ſometimes extended to the abſorption of even the oſſeous parts of the ſyſtem.

'It has been aſſerted that the power of *digitalis* in reducing vaſcular action is referrible to the ſickneſs which it induces, and that the ſame thing may be done by the exhibition of any nauſeating ſubſtance; but to this I reply, that all nauſeating ſubſtances, at the ſame time they diminiſh the velocity of the pulſe, they are found to leſſen the firmneſs of the ſtroke, and their action is ſoon over: now, a reduction of the pulſe in point of frequency is generally accompliſhed by the *digitalis,* without inducing ſickneſs; without diminiſhing the firmneſs of the arterial ſtroke,—and its effects are uniform and permanent. The digitalis poſſeſſes a certain peculiar quality, which is capable of retarding the velocity of the circulating maſs, without impairing the vigour of the ſyſtem.—The action of *opium* in ſome reſpects reſembles the action of the *digitalis.* Opium very conſtantly leſſens the number of the arterial ſtrokes, and rather increaſes their firmneſs; but its effects are not ſo permanent as thoſe of the *digitalis*; and if they were, we could not keep a patient for any length of time, under the influence of *opium,* without occaſioning very injurious conſequences. If a patient labour under a profuſe expectoration, and if in this caſe opium be repeatedly adminiſtered, we ſhall find the lungs immediately overwhelmed

whelmed with a load, which is with much difficulty difcharged.—But if, under circumftances precifely fimilar, the fyftem be charged with the *digitalis*, the fecretion from the lungs, and the fymptoms connected with this fecretion, are almoft all completely obviated; and the fmall portion of pus or mucus which continues to be fecreted is expectorated with the greateft facility.'

Whether the mode of action of this powerful drug be fuch as is now ftated, is at leaft queftionable; and we rather agree with the author, when he afterwards obferves, 'that the *modus operandi* of this plant has never yet perhaps been clearly underftood.' He does not, however, 'entertain a doubt of the correctnefs of his obfervations refpecting its efficacy; and he has the fulleft belief, that *hectic* fever, and its appendages, may be kept in check, and that the terrors of pulmonary difeafes will eventually difappear, by means of a regular and fkilful exhibition of the digitalis.'

The opinions of fome writers are combated, particularly thofe of Dr. *Lettfom*, who have expreffed doubts of the fafety of the digitalis in common practice. The author is fully convinced, that thofe terrors are the fruits of an injudicious adminiftration of the plant; for in feveral hundreds of cafes he has not met with an inftance of it producing any effect which gave him the fmalleft uneafinefs. As, however, it is allowed on all hands to poffefs the moft active powers, its reputation may be endangered by a carelefs ufe of it, though it were not abfolutely dangerous. It probably owed the neglect it had fallen into for fo many years to fomething of this fort.

A trifling error in calculation will be found, in the eftimate of the mortality fuppofed to be occafioned by pulmonary confumption, and which the author, p. 87, ftates at a fourth or fifth part of the population of this country annually:—he had before obferved, p. 29, that eighty thoufand was the number annually deftroyed by it.

Art.

Art. LXXIX. *Memoir on the Analyſis of the Black Vomit, ejected in the laſt Stage of the Yellow Fever. By* Isaac Cathrall, *of Philadelphia.* Octavo, 32 pages. Philadelphia, 1800.

THE Memoir above announced, and which relates to a ſubject ſo greatly intereſting to the weſtern world, is the reſult of long and aſſiduous inquiry. The author began his experiments and obſervations during the rage of the fatal ſickneſs at Philadelphia in 1793, and continued them for ſeven years, to the preſent period. The following account of them, extracted chiefly from the New York *Medical Repoſitory*, will, we have no doubt, be acceptable to our readers.

The black vomit is thus deſcribed:—

'The black matter, or vomit, ſo called, appears to be of two kinds. One conſiſting of a number of black flaky particles, reſembling the grounds of coffee; the other of a dark coloured inſpiſſated mucus. Of each of theſe I ſhall give a ſeparate deſcription.

'This flaky diſcharge was always preceded by violent ſickneſs and vomiting; and, as a precurſor to the ejection of this matter, in ſome caſes, the patients vomited a fluid like whey or muddy water, or one conſiſting of a brown flaky ſubſtance, reſembling chocolate or ſpoiled porter, mixed with browniſh coloured mucus.* Theſe ſubſtances were ſometimes of a lighter colour, and were ſuſpended in a glarey yellow coloured fluid, which became nearly tranſparent when at reſt, by the ſubſiding of a ſmall number of brown particles. This coloured matter was generally vomited in ſmall quantities, and with conſiderable difficulty; but when the black flaky diſcharge commenced, it was frequently ejected in large quantities, and with ſimilar

* 'The chocolate, or coffee ſickneſs, or the black ſickneſs,' ſays Dr. de Monchy, 'is not taken from the blackiſh hue or ſhade of the ſkin, but it is derived from the fœtid, blackiſh matter diſcharged from the firſt paſſages.'---See Diſeaſes in Voyages to the Weſt-Indies.

force

force to a fluid from the action of an emetic. As the diſeaſe advances, this matter aſſumes a darker colour, and its quantity ſometimes becomes ſo much augmented, that I have known one gallon vomited in forty-eight hours, beſides a conſiderable quantity, which was of a much thicker conſiſtence, that was diſcharged by the bowels. This black vomit, after ſtanding ſome hours, depoſits a black flaky ſubſtance, from a glarey yellow coloured fluid, ſimilar, in appearance, to an infuſion of green tea. Theſe depoſitions were ſometimes in diſtinct particles, but frequently in a kind of dark powder. The above particles were various in ſize, and of a very irregular figure, not unfrequently mixed with pieces of the villous coat of the ſtomach. Theſe may be diſtinguiſhed by their being longer in ſubſiding to the bottom of the veſſel than the flaky ſubſtance. There were ſome diſproportions between the yellow coloured fluid and the quantity of flaky ſubſtance, as in the other appearance of the vomit. The flaky matter was very readily reincorporated with the yellow coloured fluid, by the leaſt agitation of the veſſel; and when kept in a phial, corked for eight or ten days, aſſumed rather an agreeable, ſaccharine odour, and was extremely briſk, like fermenting beer. This laſt property is not peculiar to this fluid, but common to ſome other animal ſecretions. When the black vomit was kept for two years in a ſtate of reſt, the flaky particles became perfectly ſeparated. On agitating the veſſel, the former was immediately incorporated with the latter; and, after remaining at reſt ſix months, ſhewed ſcarce any diſpoſition to ſeparate.

‘ The mucous matter which was ſometimes vomited in the yellow fever, and particularly in that which appeared in 1797, was very ropy, and of a black colour. This matter floated on a fluid of a dark colour, which appeared to receive its tinge from the colouring matter of the mucus. When this matter was agitated in a phial,

a phial, the mucus ſhowed no diſpoſition to mix with the fluid part of the vomit, and when it was repeatedly waſhed in clear water, became nearly of the colour of the mucus ſecreted in the alimentary canal. This black matter was diſcharged, in large quantities, in the caſes which proved mortal in 1797, and was a very inactive fluid when applied to the moſt ſenſible parts of the healthy body, and was eſſentially different from the coffee-ground vomit.'

From various and repeated experiments, Dr. *Cathrall* concludes that the black vomit, beſides a conſiderable proportion of *water*, tinctured with *reſinous* and *mucilaginous* ſubſtances, contains a *predominant acid*, which is neither the carbonic, phoſphoric, nor ſulphuric. This *acidity* he found to be preſent in the *yellow coloured* fluid, taken from twenty different patients, during ſeveral ſeaſons of the prevailing yellow fever, and alſo in the *black flaky* ſubſtance. With theſe were combined muriate of ſoda, iron, and an unctuous animal ſubſtance, ſomewhat reſembling ſpermaceti. The exact proportion of the different ſubſtances he had not an opportunity of inveſtigating, for want of a ſufficient quantity of the black flaky matter to make a complete analyſis. An *acid*, which he believes to be of the ſame quality, is contained in the fluids ejected from the ſtomach a few hours *before the commencement* of black vomiting. Of this acid the author has expreſſed himſelf in *negative* rather than *poſitive* terms, faintly hinting, however, that it may be the *muriatic*.

On the effects which the matter of black vomit produces on the living ſyſtem, Dr. *C.*'s experiments are ſo original, and his concluſions ſo remarkable, that we ſhall inſert the ſection at full length :—

'From the internal ſurface of the ſtomach and inteſtinal canal appearing, on diſſection, inflamed and ſphacelated, particularly in ſome patients who had vomited black, it has been believed that the black vomit was corroſive, and had a power of acting on parts

parts it came in contact with. This power has likewise been inferred from some patients complaining of a soreness in their throats, immediately after the ejection of this black matter.

'To determine how far it was capable of acting on the healthy body, it was submitted to the following experiments:

'1st. In October, 1794, immediately after a quantity of black vomit was taken out of the stomach, after death, I applied some of it to my tongue and lips: to the latter it gave, a short time after application, the sensation of a fluid perceptibly acrid. This experiment was, the next day, several times repeated, with the same result.

'2d. A friend of mine applied it to his lips, and it produced a similar sensation, but would not affect his tongue.

'3d. Finding the effects of this matter so different from what was expected, I began to believe that this discharge varied materially, in point of activity, in different patients; but on subjecting the black vomit, procured from a number of persons, to the same test, it produced the same effect.

'4th. Two ounces of a fluid, resembling chocolate, was obtained, which was vomited a few hours before death. This was applied in the same manner; but there could not be perceived any difference in the result.

'5th. In the beginning of October, 1799, Mr. *Joseph Parker*, an active and intrepid member of the Board of Health, obligingly presented me with five ounces of black vomit, obtained from the physicians of the City Hospital. Some of this I applied to my tongue, in his presence, but could not perceive the least corrosive effect. When this fluid was applied to the skin, on different parts of the body, it produced no other effect than what water did of the same temperature. I have often immersed my hand in black vomit, immediately after it was discharged from the stomach,

and

and whilſt it was warm, without exciting the leaſt uneaſy ſenſation in the ſkin.

'October 4th, 1799, three cats were confined in a room, and fed with beef, which had a conſiderable quantity of the flaky ſubſtance of the vomit inſerted into it. This manner of feeding was continued until they had ate one drachm and an half of the flaky ſubſtance, and had drank ſeveral ounces of the black vomit. On the 5th, the excretions by the bowels were of a dark colour; yet there could not be diſcovered any difference in their health; but, from their being ſtrangers to each other, they had a conſtant propenſity to combat. This malicious ſpirit continued until the 20th, when they were diſmiſſed in good health.

'A large dog was confined in a room, and, by an aſſiſtant, his jaws were forced aſunder, and he was compelled to ſwallow an half pint of black vomit. The following day the excretions by the bowels were fluid, and of a black colour; but there could not be obſerved the leaſt alteration in his health, from the time of making the experiment until he was diſmiſſed, which was about three weeks after.

'Two full grown fowls were confined, and fed with bread, ſteeped in black vomit for twelve days. This, Mr. *Parker*, as well as myſelf, obſerved, they ate with great avidity; but it had no evident bad effect upon their health; for they continued as well after as they were before the experiment, and ſeemed to give the preference to that kind of food to every other which was preſented to them, and they appeared to thrive equally as well as if they had been fed upon corn.

'On the 3d of October, 1799, in a ſmall yard, adjoining the houſe in which I live, ſeveral ounces of the black vomit, recently obtained, was [*were*] evaporated over a moderate heat, in order to obtain the flaky ſubſtance. During this experiment, Mr. *Parker* held his head over the veſſel for ſome minutes, ſo as to inhale the ſteam of black vomit; after which we con-

tinued

tinued within two yards of the veſſel, without experiencing any unpleaſant effect.

'The following day I cauſed the windows and doors of a room to be cloſed, and the ſame experiment was repeated on a ſand-bath, conſtructed in the middle of a room. The fluid was evaporated until the atmoſphere was ſo impregnated with the effluvia of the vomit as to render the apartment extremely unpleaſant, not only from the odour of the vomit, but the warmth of the room. In this atmoſphere I remained one hour, during which I had a conſtant propenſity to cough, and had, at times, nauſea and inclination to vomit; but, after walking out in the air, theſe effects gradually ſubſided. I experienced, however, a ſenſe of wearineſs at my cheſt for many hours after.

'From the above experiments, it appears that the black vomit, when applied to the moſt ſenſible parts of the body, produced little or no effect.

'Secondly. It appears that large quantities of this fluid may paſs through the ſtomach and bowels of quadrupeds and other animals, without apparently diſturbing digeſtion, or affecting their health. This fact inconteſtibly proves the inactivity of this fluid, and renders it probable, that the ſpeedy death which enſues, after this diſcharge in yellow fever, is not from the deſtructive effects of this matter on the ſtomach and bowels, but, moſt likely, from the great degree of direct and indirect debility which had been previouſly induced, on which the black vomit is ſometimes an attendant, and ſtrongly expreſſes the great danger to be apprehended from the enervated ſtate of the ſyſtem.

'Laſtly. The experiments tend, in ſome meaſure, to prove, that an atmoſphere, highly impregnated with the odour of black vomit, recently obtained, would not produce fever, apparently under the moſt favourable circumſtances.'

Dr. *C.* next examines the opinions of authors concerning the black vomit. Theſe he claſſes under four heads,

heads. 1. That which confiders it as confifting of putrid bile. 2. As compofed of a mixture of blood and bile. 3. Of the villous coat of the ftomach diffolved in the progrefs of inflammation, terminating in fphacelus: and, 4. Of bile mingled with the *nitric* (we fuppofe he means *feptic)* acid contained in the alimentary canal. All thefe are confidered and difmiffed as inadequate or erroneous, and are fucceeded by the author's own opinion, that black vomit is *an altered fecretion from the liver.* Dr. C. grounds this conviction on the following confiderations:—

'The colouring matter of the vomit appears, from the authors already quoted, to be generally traced, after death, to the gall-bladder. This pofition being incontrovertibly eftablifhed by diffections, the power of the liver to fecrete that fubftance will be admitted of courfe, as it could not be fecreted by the gall-bladder, or tranfmitted into that vifcus through any other paffage, but by the hepatic duct. If this view of the fubject be, in any meafure, juft, it is a fact, afcertained beyond the fhadow of a doubt, that the black flaky fubftance of the vomit is an altered fecretion from the liver. This matter, being fecreted by the liver, and depofited by the hepatic duct in the gall-bladder, in the laft hours of this difeafe, is from thence forced, by the contractions of the gall-bladder and cyftic duct, in conjunction with the violent action of vomiting, into the ftomach. It there receives the addition of the yellow coloured fluid, which is almoft always ejected with the flaky fubftance. That this fluid is combined with the flaky matter in the ftomach, and not in the gall-bladder, every inquiry into the appearances after death fully confirms. This circumftance renders the yellow coloured fluid fubject to fome difference in its properties, according to the nature of the fluids received into the ftomach a fhort time before vomiting; but all that I have had an opportunity of examining, have nearly the appearance we have already defcribed. That the fecretory economy,

nomy of the liver may be ſo far arreſted in its healthy action, by the progreſs of diſeaſe, as to aſſimilate a fluid having not the leaſt analogy to bile, every work on morbid diſſections certainly prove [*proves.*] *Lieutaud* mentions a caſe from *Rivalerius*, in conſequence of a diſeaſed liver, where the fluid in the gall-bladder reſembled milk; and *Storke* relates a caſe of a dropſy ſucceeding an intermitting fever, where the fluid in the gall-bladder reſembled the white of an egg. To theſe I may add one that came under my own obſervation, of a gentleman who died dropſical, in conſequence of an enlarged liver. The gall-bladder contained a fluid, of a dark colour, having not the leaſt reſemblance to bile. Theſe, and many more caſes, could be adduced to prove the power of the liver, under certain circumſtances, to ſecrete a fluid diſſimilar to bile; but it would be needleſs to recite them, as the inſtances already quoted are, no doubt, ſufficient to eſtabliſh the fact. This peculiar condition of the ſecretory veſſels, in the yellow fever, is not confined ſolely to the liver; for we find that other ſecretory functions are ſometimes affected in a ſimilar manner, during the ſame diſeaſe, and nearly at the ſame period of time. In confirmation of theſe obſervations, I believe moſt phyſicians muſt have remarked, that in ſome caſes, the kidneys, during the period of black vomiting, ſecrete a fluid of a dark colour, which has a thick pellicle on its ſurface, and appears almoſt as different from urine as the black vomit does from bile. This diſcharge is generally a precurſor to a ſymptom which never fails to predict a ſpeedy diſſolution, viz. a paralyſis of the ſecretory functions of the kidneys.

'The more I conſider the material change produced in the different ſecreting veſſels, during the laſt ſtage of this diſeaſe, the more this theory appears to be ſupported by reaſon and the plauſibility of truth. But, though a morbid condition of the glandular economy of the liver may produce the coffee-ground coloured

 vomit,

vomit, it does not ſeem probable that the black inſpiſſated mucous matter which was ejected in the caſes that proved mortal in 1797, is derived from the ſame ſource: for the liver, under no condition of diſeaſed action that we are acquainted with, is capable of ſecreting mucus of ſuch an appearance; therefore, we think it moſt reaſonable to refer it to the ſurfaces, which are deſtined, in a ſtate of health, to ſecrete mucus. Now, admitting the axiom, 'that ſimilar cauſes produce ſimilar effects, under ſimilar circumſtances,' why may not the glandular ſtructure of the ſtomach be affected in a ſimilar manner to that of the liver and kidneys, ſo as to enable it to ſecrete the mucous matter above-mentioned? This opinion, I think, may be affirmed by other analogies, not only in the ſthenic, but in the aſthenic condition of ſecreting ſurfaces, in which there are equally as great a deviation from healthy ſecretion as the one alluded to. This we have clearly exemplified in veſſels deſtined to ſecrete mucus in a ſtate of health; but, when labouring under inflammation, evidently ſecrete pus.'

We cannot better conclude this account, than with the obſervations made on it by the editor of the *Repoſitory*, Dr. *Mitchill*, whoſe peculiar opinions on the ſubject of peſtilence and contagion are not unknown to our readers:—'Firſt,' he obſerves,' 'it appears clearly that the black vomit is not the cauſe of yellow fever, but merely a ſymptom, or rather an *effect*, of the poiſon originally applied. It is poſſible, that not a drop or particle of the ſeptic virus itſelf, which induced the diſeaſe, is preſent in the *primæ viæ* when black vomiting begins. It may have been wholly ejected by previous vomitive efforts, and the irritation of inflammation, cauſed by its preſence, ſtill remain to torture or to kill the ſufferer. This may be underſtood by compariſon with another poiſon; arſenic, for inſtance. If the oxyd of arſenic ſhould be ſwallowed, it is poſſible for every atom of it to be expelled by vomiting;

miting; but, even then, the injury done by it to the ſtomach would remain, and a dangerous gaſtritis, followed by black-vomiting, might deſtroy life. And neither in this caſe of *arſenical fever*, nor in the *ſeptic* or *yellow fever*, would the matter vomited in the latter ſtages of the diſeaſe neceſſarily contain any oxyd of the metal, or acid of putrefaction. Secondly: The black vomit, as has been ſhewn by Dr. *Miller*, in his curſory obſervations on yellow fever, publiſhed in *Med. Rep.* vol. ii. p. 412, is by no means a *pathognomonic* ſign of that diſeaſe. So far is it from being the caſe, that this awful ſymptom frequently follows the ſwallowing of the oxyd of arſenic, muriate of quickſilver, and the acetate of copper. It is alſo a frequent conſequence of the fatal operation of vegetable poiſons taken into the ſtomach. They, therefore, who have conſidered it as a *diagnoſtic* of the yellow fever have judged erroneouſly, and drawn their concluſions from very partial and limited premiſes: for, inſtead of being confined to this diſtemper, it is now well known to attend or follow the ſevere and deadly operation of moſt poiſons upon the organ of digeſtion. Thirdly: Though we are inclined to think, with the author, that former writers have given but conjectural and imperfect accounts of this dark coloured fluid, and that he has reaſoned ably on the ſubject, yet we ſhall offer a few ideas on the function of the liver in theſe caſes. This conglomerate gland, during the time of health, prepares a *bitter* and *alkaline* liquid in conſiderable quantity. The uſe or operation of this, as far as we can interpret final cauſes, is to quell and neutralize acids of all kinds in the chyle or alimentary maſs, as it paſſes through the inteſtinal canal. And a wiſe and happy proviſion it is of the Creator, that the animal economy is furniſhed with an ample ſtore of ſuch an antiſeptic and antipeſtilential liquid. But the ſecretory proceſs of the liver, as well as of the other glands of the body, is ſometimes impaired. Thoſe *violent* poiſons, which paralyze the lachrymal gland, dry up the tears, benumb

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the ſalivary glands, prevent the formation of ſpittle, torpify the kidneys, and diminiſh the quantity of urine, and, affecting the cutaneous veſſels with ſpaſm, check the inſenſible perſpiration, ſeem alſo to interrupt the bile-producing function. The ſupplies of wholeſome fluid, which the liver was accuſtomed to prepare, are withheld, and the inteſtines, at length, contain the common *ingeſta* and *excreta*, with all their proneneſs to become ſour and to irritate, without the ſoothing and controuling influence of the gall. The predominant acidity, in Dr. *C.*'s experiments, may *thus* be accounted for, and, at the ſame time, ſerve to render it yet doubtful whether the matter of black vomit proceeds from the liver. We have no proof that the liver ſecretes an *acid* liquor. During the prevalence of that ſymptom, we are inclined to believe the ſickly liver prepares too *little* bile for the wants of the conſtitution, and this *little* may be altered ſo in its quality, as, on meeting with the acidity of the ſtomach and duodenum, to exhibit a dark colour, in a manner not materially different from that quoted, p. 24, as Profeſſor *Mitchill*'s.

Art. LXXX. *A Short Account of the Royal Artillery Hoſpital at Woolwich: with ſome Obſervations on the Management of Artillery Soldiers reſpecting the Preſervation of Health. Addreſſed to the Officers of the Regiment, and dedicated to the Maſter General and Board of Ordnance. By* John Rollo, *M. D. Surgeon-General, Royal Artillery, &c.* Twelves, 173 pages, price 5s. London, 1801. Mawman.

HOWEVER local in its nature and object the work before us may appear from its title, it will be found in reality far otherwiſe, and calculated to diffuſe much uſeful information on ſubjects of great importance to military eſtabliſhments of all deſcrip-

tions,

tions, and particularly to the management and conduct of hoſpitals. The obſervations here given, though purpoſely drawn up for the uſe of the officers of the regiment under the immediate care of the author, merit the attention of all thoſe who have the ſuperintendence and controul of the ſick, in every department of military and public ſervice. In his addreſs to the officers of artillery the author juſtly obſerves, that more depends on the officer towards preſerving the health of the men than on the ſurgeon. The duty of the latter muſt be very limited in its operation, unleſs he be ſupported by the officer. Whatever relates to the accommodation of the ſick, and to the preſervation of health, can only be complete and ſucceſsful under the watchful eye of the officer; but he ought not to interfere in its detail; otherwiſe confidence is endangered, and without confidence nothing can go on right.

A particular account is given of the ſtructure of the Royal Hoſpital at Woolwich, with the oeconomy and internal management adopted. In every reſpect this Hoſpital deſerves to be conſidered as a model for ſimilar eſtabliſhments. Its ſituation, the author obſerves, is eligible. Its temperature is regulated. Its arrangement of rooms is peculiarly favourable and convenient, eſpecially for preventing the ſpreading of contagion. Its diviſion into an hoſpital and convaleſcent barrack, is extremely favourable to the reſtoration of health, and to the prevention of relapſes, by admitting of a gradual return to the active duties of a ſoldier.—Some remarks are ſubjoined on the nature and ſtructure of temporary military hoſpitals, when called for during the march of an army, or by peculiar circumſtances.

The following remarks on the deſtruction of contagion are important, and applicable to every ſituation

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where a number of perfons are collected together, whether in health or difeafe:—

'The effential points abfolutely requifite, and which have been, and are univerfally admitted on this fubject, have been already mentioned, namely, ventilation, cleanlinefs, and the management of fick with infectious difeafes: therefore thefe were held indifpenfable. Perhaps they may be entirely fufficient. We fhould, however, be unjuftifiable were we not to lay confiderable importance on other means which have been found to deftroy contagion; hence it may be inferred, they may alfo prevent its formation. It is not meant to enter into any difcuffion of the peculiar nature of contagions, or in the manner in which they are fuppofed to arife. This could anfwer no ufeful intention; we fhall be fatisfied with defcribing the eafieft, fafeft, and moft effectual method purfued in this Hofpital for the accomplifhment of the purpofes related. The compofitions are made and applied under the direction of Mr. *Cruickfhank*, our chemift and apothecary:—take of pulverized manganefe, two parts; common falt, four parts; oil, or acid of vitriol (fulphuric acid), three parts; water, one part.

'A fuitable proportion of this mixture is put into an earthen veffel, and fuffered to remain until no vapours arife from it, or its peculiar fmell is not perceptible. When a patient is admitted with an infectious difeafe, or when there are patients with fores having offenfive difcharges, one or two gallipots is placed in the wards, with about three ounces of the manganefe and falt, to which is added half an ounce of water, and then is gradually poured on the whole a part of the ounce of the oil of vitriol (fulphuric acid), the remainder occafionally. Thefe quantities are according to the proportions previoufly ftated, and they anfwer the confumption of a day. A pot or two is alfo placed on the outfide of the doors of the fame wards in the gallery. The vapour is diffufed over the whole ward, and penetrates every where, and deftroys every other fmell than what

what itfelf conveys. This vapour has been found by experiment deftructive of the contagion of fmall-pox; of courfe, it is likely to prove deftructive of other contagions. It can be ufed with effect, without prejudice to the fick, in the manner we have defcribed, and it is fo very frequently in this Hofpital. The application of it, therefore, while it deftroys contagion, may alfo prevent its formation, and fhould be employed in all cafes fimilar to thofe we have pointed out. It may prove ufeful, and we recommend its ufe in all fituations, where a number of perfons in health are confined together, as on board of tranfports, efpecially in bad weather. Two or three gallipots, with the quantities ufed in the Hofpital, would be found fufficient, and it would not be neceffary to ufe them oftener than twice or thrice a week. It merits a trial in marfhy places, where there may be an unavoidable expofure; in thefe cafes the gallipots with the materials fhould be placed in the infide of the windows and doors of the habitations next to the marfhes.'

A curious inftance is related of the production of contagion in the Horfe Artillery Barracks at Woolwich, about the end of the year 1798.

' One man of the Horfe Artillery was admitted into the Hofpital with a fufpicious fever,—next day, another. This excited inquiry. It was found they came from different barrack rooms. Thefe were followed by other men, amounting in all to eight; three of whom came from a feparate room; the reft from the fame room. The rooms were vifited with the Commanding Officer, and each of them from whence the infected men were received, was found to have different bedding from the barracks. The Horfe Artillery being a corps in conftant readinefs for fervice, and whofe appointments were always complete, had for convenience of carriage, &c. hammock bedding. The hammocks were rolled up tightly every morning, the moment the men rofe; and they were unloofed when they went into them at night. At this time we had had fo much and

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fo conftant rain, that this bedding had not been aired, or opened for a fingle day, at leaft two months. The hammocks were with their bedding examined, and the moment they were opened, a very peculiar naufeating fmell was perceptible. Immediately fteps were taken, and no further mifchief took place. Here an infectious fever evidently arofe from the confinement of the effluvia of a man's own perfon, in a time of about two months. That this fever was of an infectious nature, is certain, as the fymptoms in all affected were the fame, and two or three of them had relapfes, which affords one of the characters of this difeafe. Befides, one of the attendants was infected. A fimple inftance of the kind now recited, imparts a ftronger impreffion than a more diftant or formal one.'

On the fubject of preventing the difeafes of foldiers, the following judicious remarks are made with refpect to the means of obviating the effects of intemperance and irregularity:——

'These,' the author obferves, 'are partly obviated by ftrictnefs of difcipline, and keeping the men uniformly employed. This is entirely the bufinefs of the officer. The furgeon has an advice to give, which is, that the foldier fhould have in all fituations a mefs breakfaft, at an early hour, under the fame infpection and direction as his mefs dinner. Though this is an effential circumftance, it is not generally adopted. When a foldier takes a morning meal, before he can poffibly drink any thing improper, it nearly fecures him. This was remarkably confpicuous in the good effects which followed the change in the 45th regiment. I would, if poffible, oblige the foldier to have three regular meals a-day—breakfaft, dinner, and fupper. The two former I hold to be indifpenfable for the prefervation of health and activity.

'The foup and boiled meat ufually left at dinner, with a little addition, would make a fuitable fupper. For

For breakfaft, rich gruel with treacle or beer, rice-milk, or milk and bread; and in the Weft Indies chocolate, which is attained fo cheap that it can be afforded. In this country the foldier is often contented with weak tea or coffee. Common mixtures of beer and fpirits, or a dram with a bit of bread, fatisfies him—than which nothing can be more prejudicial. He foon becomes expofed to all the injurious effects of intemperance as formerly defcribed.

'Befides a proper diet at ftated times in the day, the foldier fhould alfo have ftated times of fleep. Regularity in this refpect, fo far as duty permits, will contribute much to guard againft the effects of intemperance and irregularity in general conduct. A man intemperate and watchful falls a ready prey to any other particular caufe of difeafe which may prefent itfelf.

'This is a proper place to obferve, that the common time of relieving daily guards, is, efpecially in many fituations, peculiarly unfavourable to health. This is a fact afcertained; but it has in general been overlooked. Guards are relieved in the morning. The men who compofe them are awake all day, and they frequently obtain too much liquor. At nights they muft often be badly prepared for the duties of centinels. Even if the duty is unobjectionably performed, they are, from the watchfulnefs and drink of the day, extremely liable to be influenced by the night air. In cold and damp fituations they will be attacked with complaints, and thefe, thus difpofed, will end in confumption and death. In hot climates difeafes will arife; and if near fwamps, agues of a bad kind will be produced. This I have feveral times witneffed; but I have alfo had the fatisfaction of obferving the evil remedied, by the guard being mounted or relieved at the time of the evening parade, in place of the morning.

'We may alfo here introduce the great utility of warm cloathing in expofed fituations, efpecially of the flannel fhirt and worfted ftockings. The great coat is alfo indifpenfable. I remember it was remarked, that the guard of the 67th regiment in Grenada had always fewer

fewer men than any other falling ſick, and this appeared to ariſe from each man being obliged to have on a flannel waiſtcoat next his ſkin, and worſted ſtockings on his feet. The centinel is apt to lay aſide his great coat, which ſhould never be allowed. Diſcipline; three, or at any rate two regular meſſes a-day, and one of them a breakfaſt; changing the time of mounting guard, and warm cloathing—conſtitute the moſt effectual means of obviating the effects of intemperance and irregularity.'

ART. LXXXI. *A Conciſe View of the moſt important Facts which have hitherto appeared concerning the Inoculation for the Cow Pox. By* C. R. AIKIN, *Surgeon.* Octavo, price 2s. 6d. London, 1800. PHILLIPS.

ART. LXXXII. *Obſervations on the Utility of Inoculating for the Variolæ Vaccinæ, or Cow Pox. By* EDWARD GARDNER. Price 1s. 6d. London, 1801. JOHNSON.

ART. LXXXIII. *Practical Obſervations on the Inoculation of the Cow Pox; to which is prefixed a compendious Hiſtory of that Diſeaſe, and of its Introduction as a preventive of the Small Pox. Deſigned principally to promote a Knowledge of the Subject amongſt thoſe who have not hitherto attended to it. By* JOHN ADDINGTON, *Surgeon.* Price 1s. 6d. London, 1801. JOHNSON.

ART. LXXXIV. *Evidences on the Utility of Vaccine Inoculation: intended for the Information of Parents. By* THOMAS CREASER, *Surgeon.* Price 1s. Bath, 1801.

OF theſe ſeveral pamphlets on the ſubject of Cow pox (and there may be others that have not reached us), all of them deſigned for the purpoſes of pointing

pointing out to general notice the benefits of the new practice, and of obviating many prejudices which naturally arise with regard to it in the public mind, it is only necessary to observe, that they are sufficiently well calculated to answer the intentions of their authors. Argument may do much, but time will effect more, in settling the yet wavering opinions of the people on this important question.

Art. LXXXV. *The Select Works of* Antony Van Leeuwenhoek; *containing his Microscopical Discoveries in many of the Works of Nature. Translated from the Dutch and Latin Editions published by the Author. By* Samuel Hoole. Vol. I. Part 1st & 2d. Quarto, 314 pages, with ten plates, price 2l. 2s. London, 1800. Nicol.

THE discoveries of *Leeuwenhoek* in the minute and nearly invisible regions of Nature, have long ago excited the attention of the philosophical world, and the admiration of the vulgar. Some, indeed, have questioned their truth or accuracy, and, in the contemplation of objects so far beyond the reach of our ordinary senses, unaided by artificial help, misconceptions may undoubtedly now and then have been formed: but of the general truth of the author's observations few now can doubt, who reflect on the support they have received from a cotemporary writer and observer, Dr. *Hook,* and from the later experiments of the indefatigable *Spallanzani* in the same field. To the English reader the present Translation will, we have no doubt, prove highly acceptable, and he will look forward with impatience to the completion of the work. A few occasional notes and additions are furnished by the Translator, none of them of much importance, and for the most part merely illustrative.

The

The following are the subjects treated of in the present volume.—Of the structure and production of Oak and Fir Timber, as apparent in the microscope—Of the *Weevil,* or Corn-Beetle—Of the Maggot or Caterpillar infesting Corn in Granaries—Of the Garden Spider—Of the Silk-Worm—On the Nature of the Scales of Fishes, and how the age of those Animals may be determined by observation of the Scales—Refutation of the Doctrine of equivocal or spontaneous generation in the instance of the Sea-Muscle—Of the Muscle which is found in fresh water—On the Circulation of the Blood, completely visible in Fishes—Of the Formation of the Teeth in several Animals; the structure of the human Teeth explained, and some of the disorders to which the same are liable accounted for—On Coffee—On Vinegar—Of the Scorpion—Of the Oak-Gall, or Gall-nut, and the manner of its formation by an Insect—Of the Animalcule found in the Livers of Sheep and other Beasts—Of the formation of Peat—Of the effects of Acids in the Stomach, and the use of Fish Diet, with a particular description and examination of the liquor termed Runnet—Of the Snail or Insect found on the Vine—On Wheat, and the manner of its Vegetation—Of the Cocoa-Tree, and Nut—On Hops—On Cochineal---Of some species of Amber---Of the Herb Periwinkle---Of the Root named *Pareira Brava*---Of the Crystalline Humour of the Eye in various Animals---On the internal formation of an Ox's Tongue; and on that of the Heart in Animals, Fowls, and Fishes---Of Quills and Feathers; on Human Hair, and the Hair and Wool of Animals---Of the vast production of Fishes---Of the Nutmeg---On damaged Mace, commonly called White Mace.

The whole work will be comprized in another volume, which is shortly expected to make its appearance.

ART.

Art. LXXXVI. *Practical Obſervations on the Uſe of Oxygen, or Vital Air, in the Cure of Diſeaſes: to which are added a few Experiments on the Vegetation of Plants.* By D. Hill, *F. R. S. &c.* Part I. Quarto, 58 pages, price 7s. 6d. London, 1800. Rivington.

NINETEEN caſes of diſeaſe are here narrated, in which the inhalation of oxygen gas was had recourſe to, though not without the aid of other approved remedies. They were chiefly of a ſcrophulous nature, and diſappeared under the plan of treatment above deſcribed. Amongſt others, a caſe of chronic hydrocephalus is related, where the head had acquired an enormous ſize, but was gradually and totally reduced during the employment of the oxygen gas.

Without at all doubting the powerful agency of oxygen, and other gaſes, in the living ſyſtem, we may remark, that the obſervations on the ſubject here furniſhed, by no means eſtabliſh, in a decided or unqueſtionable manner, their curative powers. The following remarks of the author, ſubjoined to the caſe of hydrocephalus above alluded to, and which he deems explanatory of the mode of action of the remedy, appear to us exceedingly hypothetical and inconcluſive.

'In the firſt plaee,' he obſerves, 'that matter of nouriſhment, denominated *hydrogen* by modern chemiſts, which, after ſolution or digeſtion in the ſtomach, is abſorbed by the lacteals from the bowels, and conveyed by the thoracic duct to the left ſubclavian vein, and thus into the circulation, by the vena cava ſuperior into the right auricle of the heart, exiſts in a weakly-combined ſtate in the blood, ready to unite with the vital air which the lungs are conſtantly receiving in reſpiration. This nouriſhing hydrogenous principle ſeemed in this child's habit to be in great exceſs. The chemical union of vital air with this hydrogenous principle,

principle, and perhaps with other ſubſtances in the blood, as carbone, &c. immediately let looſe their latent caloric, and imparted a higher degree of temperature to the cold, weak, exhauſted body, alike ſubdued in ſtrength by the defect of mental and nervous energy; and by the weakened action of the heart and arteries. While the oxygen, or baſe of vital air, by its union with the hydrogen, imparted this beneficial warmth to the body, at the ſame time it formed water. This paſſing off by the ſecretions of the kidneys and ſkin, removed a cauſe of irritation that exiſted in the conſtitution, and produced quiet ſleep. Thus by a mild repetition of this air, keeping up the action of ſtrength, and ſupplying the conſolidating principle to the habit, the abſorbent veſſels gradually took up the ſuperabundant fluid on the brain. The arteries too were enabled to convey all the neceſſary materials for the ſecretion and depoſition of bony matter, until the head was reduced nearly to its natural ſtate, and freedom of motion was reſtored to all the paralytic limbs.'

ART. LXXXVII. *Reports on the Diſeaſes in London, particularly during the Years* 1796, 7, 8, 9, *and* 1800. *By* ROBERT WILLAN, *M.D. F.A.S.* Twelves, 360 pages, price 4s. 6d. London, 1800. PHILLIPS.

TO many of our readers the *Reports* here given will not be new, a conſiderable part of them having been already before the public anonymouſly, through the medium of different Monthly Journals, as the *Monthly Magazine* and *Medical and Phyſical Journal.* The local Hiſtory of Diſeaſes, when given on a ſufficiently large ſcale, forms always an important ſubject for inveſtigation; for the nature and treatment of diſorders are found to vary much at different periods,

from

from changes in the ſtate of ſociety, and other cauſes. It is well aſcertained, that medicine, ſince the days of *Sydenham,* has undergone material alterations, particularly in cities and towns, not only in its inſtruments, the conſequence of diſcovery and improvement in the auxiliary ſciences, but in the phyſical conſtitution of the human frame and its diſeaſes. A faithful and accurate delineation of the character of Diſeaſes, with their moſt approved treatment, at different periods, is therefore highly deſirable. To perfect a work of this kind, however, the labour of many concurrent obſervers is neceſſary; yet, as far as the exertions and opportunities of an individual can go in this matter, the work before us is entitled to much praiſe; and it is to be wiſhed that the author's example were more generally followed by thoſe holding public ſituations in the practice of phyſic.

In drawing up his *Tables of Reports,* Dr. *Willan* has divided Diſeaſes into three claſſes: the *Acute, Chronic,* and *Periodical*; and they are thus diſcriminated:——

'1ſt. Acute Diſeaſes are attended with diſturbance of the bodily functions, ſo violent and general, that unleſs they terminate favourably, or change their form, they muſt prove fatal within a ſhort compaſs of time. The ſymptoms characterizing an acute diſeaſe at its commencement, and which have little remiſſion during its courſe, are, ſudden and conſiderable loſs of ſtrength, pain in the loins, aching of the limbs, total incapacity of attention or exertion of mind, heat of the ſkin, thirſt, a frequent pulſe, and furred tongue. Theſe general ſymptoms, differently proportioned and variouſly modified, according to the ſtrength, depreſſion, or irregularity of the pulſe, the ſtate of mind, and appearances of the tongue, form the ſubdiviſions, and generic diſtinctions of febrile complaints.

'2d. Chronic Diſeaſes are of long duration, and moſtly conſiſt of uneaſineſs in ſome part or organ, and of impediments to the performance of its functions.

They are uſually attended with general debility, but not with violent diſorder of the conſtitution.

'3d. Periodical Diſeaſes are characterized by a return, at ſtated intervals, of pain and general diſorder, or fits of ſhivering, followed by heat of the ſkin, and perſpiration, the whole being comprized in leſs than twenty-four hours. During the intervals, however, the patient is not in a ſtate of health, but has a ſallow complexion, and is affected with langour, debility, loſs of appetite, &c.'

It is proper to obſerve, that the author, in more than one inſtance, with what propriety we ſhall not determine, denominates diſeaſes differently to the generality of practitioners of the preſent day. Thus with regard to the term *Hectica*, he obſerves, 'it is uſed below in the ſignification given to it by the Greek phyſicians, among whom it was not conſidered merely as a ſecondary complaint, depending on internal ſuppuration, or any local defect, but as ariſing from a failure of ſtrength in old age, from an exhauſted ſtate of conſtitution, occaſioned by fatigue, long faſting, anxiety, or loſs of ſleep; and ſometimes as a ſequel of *Cauſos*, or other fevers. They remark farther, that the *Hectica* often appears at firſt like an Ephemera; that it is always aggravated after food, that its duration is indefinite, and that it often terminates in a maraſmus. All the ſpecies of Hectic are characterized by the recurrence every twenty-four hours, or ſometimes every twelve hours, of heat of the ſkin, after ſlight chillineſs, with a circumſcribed fluſh of the cheeks, an increaſed velocity of the pulſe, and violent perſpirations towards morning. In infancy, childhood, youth, and old age, Hectic takes place, without any local affection, from changes in the conſtitution, connected with the different ſtages of human life. A ſimilar ſtate of diſorder is often produced in perſons of the middle age, when the conſtitutional vigour firſt appears to decline, not reſiſting as uſual the operation of cold, fatigue, and other occaſional cauſes. This

ſtate

ftate is moftly accompanied with aphthous ulcerations ofthe tongue and fauces, and a large fecretion of frothy phlegm. Under this head alfo muft be ranked the *Febris aphthofa*, or *Hectica aphthofa*, often put down in the fucceeding lifts. It commences with violent and repeated fhiverings, fucceeded by flufhes of heat; with pains of the head, neck, and limbs, roughnefs of the throat; a dark rednefs and enlargement of the papillæ of the tongue, likewife an enlargement of the veins of the uvula, tonfils, &c. The formation of Aphthæ is immediately followed by a drynefs of the tongue, clamminefs of the mouth, naufea, hiccough, heat in the ftomach, which is increafed by medicines, wine, or food taken warm. A Diarrhœa fupervenes, in which the ftools are of a dark-brown colour, and often ftreaked with blood. The urine is at firft clear, but has afterwards a curdly pink fediment, as in other hectic cafes. There is ufually pain and deafnefs in one ear, with great pain and tendernefs in the foles of the feet. A circumfcribed rednefs appears on the cheeks towards evening, attended with a quick pulfe, heat of the fkin, flight delirium, and reftleffnefs. During the day the patient is languid and heavy, fometimes thirfty, with but little appetite. After the tongue, fauces, &c. have been healed, the aphthous ulcerations return again, with internal heat, general uneafinefs, and the fame train of fymptoms as at firft. By frequent relapfes of this kind, the patient is often reduced to an extreme degree of debility and emaciation; and the whole duration of the complaint is from five to twelve weeks. The cafes of Hectic, put down in the laft report for the year 1800, were moftly of the kind here defcribed.'

It is not poffible to give a connected view of a work of the defcription of the one before us: we fhall, therefore, content ourfelves with tranfcribing a few of the leading points, which will ferve the double pur-

poſe of ſhewing the author's ſentiments on particular ſubjects, and of enabling the reader to form an opinion of the general execution of the work.

The remarks on *Aſthenia*, or that ſtate of irritable weakneſs which is now very prevalent, and owing probably to the ſtate of modern ſociety, are not without intereſt, and afford another inſtance of the author's novel employment of terms.

'In the liſt of Chronic Diſeaſes,' he obſerves, 'it ſeems proper to take ſome notice of the article *Aſthenia*, comprehending the diſorders, in general, denominated Nervous, which have occurred in a great proportion, eſpecially during the ſummer months. The ſtate of aſthenia commences with general langour, a ſenſe of laſſitude, or aching in the limbs; and often with tremors. Theſe ſymptoms are ſucceeded by ſhooting pains, head-ache, giddineſs, and a ſtrong diſpoſition to ſleep, even in the day-time. There is a ſenſation of faintneſs, or depreſſion, referred to the ſtomach, which calls for a frequent ſupply of nouriſhment: but as the craving is not ſeconded by a proportionate activity of the digeſtive powers, an over-charge ſoon takes place, and produces heart-burn, flatulency, violent pains of the ſtomach, or nauſea, with bilious vomitings, and diarrhœa. Females, in theſe circumſtances, are diſtreſſed with a pain in the left ſide, ſometimes alternating with the pain in the ſtomach.

'This complaint takes away the ability of any conſiderable corporeal exertions; and alſo renders a long attention of the mind to any ſubject not only difficult but painful. The patient's temper is irritable, fretful, and capricious; the judgment is defective and irreſolute; the imagination ſuggeſts none but gloomy ideas, often extending to deſpondency. No taſte remains for accuſtomed amuſements, but every feeling, every ſenſation, ſeems unpleaſant. The night-ſleep is diſturbed by frightful dreams and ſtartings; and the patient

patient awakes, in the morning unrefreſhed, or feeling as if much bruiſed and fatigued.

‘ *Sauvages*, in treating of Aſthenia, includes under that title, the debility conſequent on Fevers, Small-pox, Scurvy, Hydrocephalus, and ſeveral local complaints. He farther obſerves, that in Aſthenia there is a general weakneſs of all the limbs, the vital powers retaining their full vigour; or, that the debility of the voluntary motions is much greater than could be ſuppoſed from examining the ſtate of the pulſe. This remark ſeems to have been made with the view of ſupporting an hypotheſis:—it has certainly no foundation in truth. The pulſe, in every inſtance of Aſthenia, is much reduced in force: in perſons of the ſanguine temperament, it is weak, and uſually very frequent; but, in melancholic habits, it is always feeble, ſlow, and languid. The former caſe conſtitutes the prediſpoſition to Syncope, Hyſteria, Chorea, Tetanus, and other convulſions; to Mania, Gaſtrodynia, Pyroſis, Diarrhœa, Tabes meſenterica, Fluor albus, Urticaria, Porrigo, and ſeveral puſtular eruptions on the ſkin. The latter prediſpoſes to Indigeſtion, Hemicranium, Hypochondriaſis or Melancholia; to Epilepſy, Catalepſy, Ephialtes, Chloroſis, Conſtipation, chronic Rheumatiſm, Struma, internal Scirrhoſities, Gravel, Dropſy, Diabetes, Purpura, and of ſcaly diſeaſes of the ſkin.

‘ Impure air, ſedentary occupations, anxiety, and the irregular modes of living in a crowded city, are the external cauſes which lay the foundation of Aſthenia. Not only thoſe inhabitants are affected with it, who live delicately, and withhold themſelves from no indulgence, but labourers, ſervants, and all perſons confined in a dull, unvaried track of buſineſs, are ſenſible of its effects. In ſummer the complaint is much aggravated by the relaxing influence of a warm, duſty atmoſphere; to which may be added the ſtifling heat reflected from continuous brick walls, windows, and a burning pavement. Unhappy are they who are doomed to toil in ſuch a ſituation throughout the year!

who ſeldom enjoy the ſun's direct rays in the colder ſeaſons; and during the hot months "are never fanned by the weſtern breeze!" In the moments of langour, they court the deluſive aid of ſpirits, by which all their complaints are rendered more inveterate; they gradually droop and pine; become hectical, conſumptive, or paralytic, or, falling into the ſtate of chronic weakneſs, ſo well deſcribed by Dr. *Withers*, remain, through life, a burthen to their friends, the public, and themſelves.

'Patients in the firſt ſtate of Aſthenia, or whoſe conſtitutions have not been too deeply injured by a long reſidence in town, retrieve their health by means of cold bathing, tonic medicines, and occaſional excurſions into the country. There, a change of purſuits, a more regular plan of diet and exerciſe, a more clear and pure atmoſphere, the ſalubrious exhalations from growing vegetables, and the grateful ſtimulus of their odours, in a ſhort time reſtore vigour to the body, and, along with it, firmneſs and ſerenity to the mind.'

The following obſervations on Bathing are highly important. We wiſh much that they were attended to by thoſe to whom they are particularly addreſſed:—

'Cutaneous Diſeaſes are often connected with diſorders of the ſtomach, and with the general ſtate of *Aſthenia*, formerly deſcribed. They originate in London, on very many occaſions, from an habitual neglect of cleanlineſs in workmen and others. Not only the lungs, but the ſkin muſt be injured by the trades enumerated, page 300. And how are the poor, without accommodations for the purpoſe at home, to clear their bodies from the dirt, duſt, and unctuous or adheſive ſubſtances, which various employments faſten on them? There being no proviſion in any part of the metropolis for waſhing or bathing, they quietly ſuffer the penalties annexed to the want of cleanlineſs, as diſagreeable ſmells, perpetual irritation with chaps and fiſſures on the ſkin, boils, and eruptions of painful,

ful, inflamed puſtules, the itch and prurigo, the lepra, the dry tetter, the running tetter, the dandriff, and ſcald-heads. To plunge into the Thames is difficult and dangerous: we are therefore obliged to tolerate the diſguſting and indecent plan of bathing in the New-River, to which hundreds of men and boys reſort every fine day in ſummer, and pollute the water as it flows into our ciſterns. It is not, however, this revolting idea which ſhould ſtimulate us to action: the healths and comforts of the poor inhabitants merit a prior conſideration. Indeed all ranks of ſociety would be greatly benefited by the eſtabliſhment of cold and tepid baths, acceſſible at a moderate expence; for by a ſtrange thoughtleſſneſs, moſt men reſident in London, and very many ladies, though accuſtomed to waſh their hands and face daily, neglect waſhing their bodies from year to year. Hence the perſpiration condenſed on the ſkin gradually obſtructs the exhalant pores, thereby producing various internal complaints, and an univerſal itching over the ſurface of the body, to which ſome delicate ſufferers reconcile themſelves, by ſuppoſing a ſcorbutic diſpoſition communicated by their progenitors, without any fault of their own. Itching eruptions on the ſkin often denominated Scurvy, or the Engliſh Malady, will never be eradicated, until bathing or waſhing in warm water become general. The introduction of it, however, is not likely to be the work of phyſicians or philoſophers alone. They muſt firſt influence thoſe who are the leaders of faſhion. Let ſome of our nobility erect baths on the oriental plan, in their ſpacious manſions, and, by ſetting an example, induce others to make the practice of bathing habitual. The cuſtom would ſoon be adopted in every part of the metropolis: and, I have no doubt, the Governors of the City, ſtrictly ſo called, whoſe liberality appears on ſo many occaſions, would concur in eſtabliſhing public baths for the uſe of manufacturers, ſervants, labourers, &c.

and in providing ſituations and ſupport for others, to be uſed by perſons of a better rank, at a moderate expence. In all the cities of antient Greece, baths were erected and regulated under public authority. At Rome, ſplendid edifices of this kind were built for general uſe, and furniſhed with aqueducts, by the munificence of wealthy individuals, ſometimes on patriotic principles, ſometimes with a view of acquiring popularity. Under the Emperors there were once 870 baths in the city and ſuburbs. The bath of *Antoninus Caracalla* is ſaid to have been ſo large that it could accommodate, without inconvenience, 1800 perſons at the ſame time. Many of our rich and public-ſpirited citizens have ſingly formed eſtabliſhments of great utility and extent. How much applauſe would that liberal man deſervedly obtain, who ſhould be firſt to adorn the metropolis of his country, and benefit its inhabitants, by the inſtitution here recommended,—an inſtitution ſo neceſſary for the health and comfort of all.'

A comparative view of the Bills of Mortality, at different periods, is given towards the concluſion of the work, and accompanied with the following general remarks:—

'The general Bill of Mortality, for the year 1800,' the author obſerves, 'ſpecifies a remarkable increaſe of deaths from fevers, and is a collateral proof of the extenſive diffuſion and virulence of contagious fevers ſince the autumn of 1799. Their fatality was continued to the end of 1800, no ſettled froſt having taken place in the month of December. The total number of deaths in 1799 was leſs than that in 1800 by 4934. This laſt year appears to have been moſt deſtructive to infants under two years of age, and to old people; 6657 having died of the former; of the latter 2219, above ſeventy years of age. An increaſed mortality may alſo be remarked on inſpecting, in the laſt Table, the articles of Conſumption and Aſthma, Dropſy,

Water

Water in the Head, Small Pox, Meaſles, Pleuriſy, external Inflammation, and Mortification. Hence it will appear the extremes of heat are not, in this climate, leſs detrimental, even in pulmonic diſeaſes, than an extreme degree of cold. How much a moderate and uniform temperature contributes to leſſen the annual mortality among us, may be ſeen from Dr. *Fothergill's* account of the weather and diſeaſes in 1751, 1752, 1753, and from the Annual Bills for the ſame, compared with thoſe of the years immediately preceding or ſucceeding.

'On farther comparing the London Bills of Mortality, at the middle and cloſe of the ſeventeenth century, with thoſe of the eighteenth century, it will appear,—

'Firſt, That continued and intermittent fevers were much more fatal, in proportion to other complaints, formerly, than at preſent.

'Secondly, That the Dyſentery, and other diſorders of the bowels were, 150 years ago, attended with a greater degree of fatality than we now experience.

'Thirdly, That the deaths from convulſions muſt be referred chiefly to infants; chriſoms and infants having been gradually reſolved into the article of Conſumption.

'Fourthly, The Croup is an article but of a very modern date.

'Fifthly, That the articles of Cough, Conſumption, and Aſthma, or Hydrothorax (termed ſtoppage in the ſtomach), have at all times predominated.

'Laſtly, it will appear, although the population of London muſt be ſuppoſed to be increaſing, that the annual mortality has, in 50 years, been greatly diminiſhed.—This may be referred partly to the numerous improvements made in the city, which have contributed to preſerve the health of its inhabitants: but partly, I truſt, to the more accurate application and greater certainty of the medical art in the treatment of

diſeaſes,

difeafes, by attaining which our profeffion has been rendered more extenfively beneficial to mankind.'

The work is terminated by a Table of Meteorological Obfervations, taken from the Tranfactions of the Royal Society of London.

ART. LXXXVIII. *De la Nature et de la Ufage des Bains. On the Nature and Ufe of Baths. By* HENRY MATHIAS MARCARD, *Phyfician to the Duke of Holftein-Oldenburgh,* &c. *Tranflated from the German by* MICHAEL PARANT, *M. D.* Octavo, 290 pages, price 5s. Paris, 1801. Imported by BOOSEY, London.

THE Treatife of M. *Marcard* on *Bathing* in general, of which a French tranflation is here given, is probably the moft complete of any that has been furnifhed on the fame fubject. A confiderable number of years has been fpent by the author in the preparation and arrangement of his materials, and every acceffible fource of information reforted to. The errors which have obtained very generally on the fubject are pointed out and corrected, and a view of the whole is given in a manner confiftent with the prefent improved ftate of Medical Science.

The firft chapter gives a fketch of the hiftory of *Bathing* ; the difference of baths, and their divifion according to the degree of heat at which they are employed. The ufe of *Baths*, the author obferves, is of the moft remote antiquity, and originated, in all likelihood, in the warm regions of Afia, the cradle of the human race. Baths were much ufed amongft the Egyptians, and the Greeks fpeak of them in the fabulous periods of their hiftory. The nations of antiquity in general bathed much, though for the moft part in rivers ; but domeftic warm baths were likewife in

in uſe among them. *Homer* ſpeaks of them in ſeveral parts of his poems.

Hippocrates, the oldeſt writer in medicine, whoſe works have come down to us, ſpeaks frequently of bathing as a remedy much uſed, and extremely uſeful in a great number of maladies. *Celſus* informs us, that in Rome, in the earlier ages, *bathing* was conſidered as a hazardous practice, but that *Aſclepiades*, whoſe diſciple he was, preſcribed it with greater boldneſs. It is well known to what exceſs bathing was employed in this city, and throughout Italy, when luxury had eſtabliſhed itſelf among them. *Tacitus* obſerves, that the Germans in his time bathed themſelves in preference in hot water; becauſe, adds the the hiſtorian, winter in this country reigns almoſt throughout the year.

Fluids of all kinds have been employed for the purpoſe of baths. At the preſent day, baths of milk and of whey are ſtill in uſe; whilſt thoſe of oil, of wine, or of broths, have been laid aſide. One cannot reflect without horror, that baths have been made of human blood. *Pliny* relates that this remedy was employed in Egypt for the cure of the leproſy.

Humid and aeriform vapours have alſo been employed as baths; and ſometimes the body has been buried in ſand, in dung, or in the freſh mould on the ſurface of the ground. Sometimes the whole body is immerſed; at others the bathing is partial. Baths, again, are ſimple; or medicated by the addition of different ingredients; or different by Nature, as ſea-water, mineral waters, &c. Laſtly, the moſt important diſtinction of baths is according to the degree of heat at which they are employed. Under this head the author makes four diviſions: 1. The *hot bath*, when the heat exceeds the temperature of the human body, that is, above 96 degrees: 2. The *warm bath*, from 85° to 96°: 3. The *cool* or *temperate*, from 65° to 85°: and the cold bath, ranging from 32°, or the freezing point, to 65°. The line of diſtinction is very properly drawn

drawn at the natural heat of the body; for, above this point, the bath produces effects totally different from what would ensue from a degree of heat inferior thereto.

In the second chapter the author treats of the warm bath (85° to 96°), and points out the method pursued by him in his discussion of the subject. In the succeeding one he considers the relaxing and debilitating effects ordinarily attributed to the warm bath. In reflecting on the general opinion on this subject, one would be led to conclude that the constant and sole effect of the cold bath was to strengthen, whilst that of the warm bath was to relax and enfeeble the human body. *Pomme* establishes his whole theory of the diseases of the nerves, and their cure, on this basis. *Marteau*, *Maret*, *Macquart*, and the greater number of British authors on this subject, regard it as a determined matter, that the warm bath relaxes the fibres and enervates the body.

This notion the author combats with much success, and shews from history, as well as from reason and the laws of the animal oeconomy, that it is altogether unfounded, at least to the extent that has been commonly held. The Greeks and Romans, he observes, were so much in the habit of employing baths, that their opinion on this point is entitled to much attention. *Plato* in one part of his writings observes, that it would be desirable to form by law public establishments of warm baths. The antients, and especially the Romans, bathed themselves daily, nearly as often as we are accustomed to wash our hands. *Laurent Joubert*, a French physician, and a diligent inquirer into antiquity, has produced a great number of examples of illustrious Romans, who bathed habitually, especially in summer, four, five, six, and sometimes eight times in the 24 hours, and every one bathed at least once daily. Abstinence from bathing was considered as a proof of the austerity of life of some Grecian

cian prieftefles. The principal baths of the Romans were warm, as is evident from their conftruction, of which the fplendid remains are ftill extant at Rome and at Pompeia. The cold bath was not in general ufe at Rome till after the brilliant fuccefs of Mufa, in the ficknefs of the Emperor Auguftus.

The *debilitating* and *relaxing* effect of the warm bath, therefore, could not but have been noticed by them, had it exifted; but not the leaft trace is difcoverable of their having entertained fuch an opinion of its operation. The antients dedicated warm baths to *Hercules*, whence it may be inferred that they thought them capable of augmenting the phyfical powers of the body. The experiments which have been inftituted by fome on parchment, leather, and animal fibres, in the dead ftate, in order to prove the relaxing effect of the warm bath, the author fhews are totally inapplicable to the living body, and therefore of no weight in determining the queftion.

In the fourth chapter M. *Marcard* inquires whether the warm bath is *heating* to the fyftem. The antients were not of opinion that it produced fuch an effect. *Hippocrates* prefcribed warm bathing in acute difeafes, as peripneumony. *Galen* eftablifhed it as a precept that the warm bath is of eminent utility to thofe who had an excefs of internal heat, and whofe excretions fmoked when difcharged. Modern writers, for the moft part, have held a different opinion. In order to determine the point, the author firft inquires 'whether the living animal fibre is fubject to the fame laws of external heat, as govern other inanimate bodies.' From a variety of confiderations, and particularly from the experiments of Drs. *Blagden* and *Fordyce*, as related in the *Philofophical Tranfactions*, he is inclined to conclude negatively. Thefe gentlemen found, that after remaining for the fpace of 15 minutes in a room heated to 119 degrees, the heat of the body did not exceed 100°, although the pulfe beat

120 strokes in a minute. When the same individual passed into a second room heated to 130°, the pulse rose to 139 in a minute, yet the heat of the body continued at 100°. Other persons, having previously rested awhile in a highly heated room, passed into a chamber, the temperature of which was raised to the astonishing height of 211 degrees, and after seven minutes, the heat of the body was found not to exceed 98 degrees. A dog was kept for half an hour in a heat of 220° to 236°, a heat sufficient to dress a beef-steak in little more than half an hour, yet at the end of that time the animal came out apparently well and active.—The degree of heat of the animal was not ascertained.

From these experiments, therefore, and from observing the unequal communication of heat in different persons, it is reasonable to conclude that the living body is not in this respect subject entirely to the ordinary laws of the communication of heat, and that this difference in different persons is regulated by the force of action of one constitution as compared with another. In all events it is well known, that the transpiration of the living body, augmented in proportion to the heat with which it is surrounded, opposes the passage of this principle, by charging itself every instant with the particles of heat which approach the surface, by the aid of which it exhales in the form of vapour: and in this respect at least the living body differs from the dead, and is less readily penetrated by heat.

Even admitting, which is not proved, that *very hot* baths heat the living and the dead body to the same degree, this would be no reason for believing the warm bath (85° to 96°) to have a power of heating the system. The contrary, indeed, is the fact; and to prove this, it is only necessary to observe its effects on the body after an hour's immersion, when the system will be found in the most calm and agreeable state. It is impossible, also, that, by the aid of simple contact, one

one body can communicate to another a heat greater than what itſelf poſſeſſes. Another mode may, indeed, be imagined, by which the warm bath might prove heating to the body, and that is by *irritation*, which, as we know, is capable of increaſing the temperature of the body, without the aid of external heat. With the exception of ſome rare inſtances of diſeaſe, the heat of the body never exceeds its natural degree, unleſs this effect has been preceded by increaſed circulation, and frequency of the pulſe and reſpiration, from whatever cauſe ariſing. This leads the author, in the following chapter, to examine what are the effects of the bath on the pulſe and on the reſpiration; a queſtion the determination of which promiſes to ſettle that of the *heating* power of baths of different temperatures.

The experiments and obſervations of writers reſpecting the effect of bathing on the pulſe are little to be relied on. Thoſe of Dr. *Haygarth*, as recited in *Falconer*'s Treatiſe on the *Bath waters*, appear to the author extremely doubtful, for he would have expected from 110 to 114 degrees of heat, effects much more violent than thoſe which are related. It is certain, he obſerves, that the laſt experiment of this writer is inaccurate, or was never actually made; for it is ſaid that the pulſe, in a bath of 93 degrees, was raiſed from 72 to 84 ſtrokes in the minute, a circumſtance which could not have taken place but from acceſſory cauſes, which are not mentioned.

The author's own experiments ſeem to have been made on an extenſive ſcale, and with an accurate and minute attention to all the circumſtances which could influence them. They afford the following general reſults.

1. He found that whenever the heat of the bath was under 96 degrees, the frequency of the pulſe was diminiſhed, unleſs this effect was prevented by particular cauſes.

2. The

2. The more frequent the pulse is, and the more it departs from the healthy state, the more it is diminished by the bath.

3. The temperature of the bath which seems to have the greatest effect in diminishing the velocity of the pulse is that styled the warm bath, ranging from 85° to 96° of *Fahrenheit's* scale.

4. The longer the time of staying in the bath, the more the frequency of the pulse diminishes: the author found in himself, that after an hour and a half, the pulse descended from 65 to 54.

5. Although the warm bath diminishes the frequency of the pulse, and, with the exception of a few rare instances, this rule is general, there is not any certain law by which this phenomenon is governed, experience shewing, that it varies greatly. The action of the same temperature on the same individual being different at different times, and still more so in different constitutions; owing probably, to the degree of nervous mobility possessed at the time.

It appears, then, that the warm bath never accelerates the pulse; on the contrary, that it almost always renders it more slow: the charge therefore which has been made against it, of *heating* the body, must fall to the ground. With respect to the respiration being increased by the use of the warm bath, the author observes, that, except in certain uncommon states of the organs, this function always corresponds with the circulation of the blood; if this is rapid, respiration is frequent. The warm bath reduces regularly the quickness of breathing after a certain time. It is natural, indeed, that the respiration should partake of the calm which reigns throughout the system, and that it should become more slow, when the pulse beats slowly. At the same time it is to be expected, that in persons that enter the bath with fear or anxiety, this function will be accelerated as long as such a state of mind remains.

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The 6th chapter contains obfervations on the effects of warm bathing on the pulfe, and its application in the treatment of difeafes. There exifts, the author remarks, many ways of accelerating the pulfe; but, with the exception of certain gentle and paffive movements, as failing or fwinging, which have been faid to leffen the frequency of the pulfe, there is not, in the whole *Materia Medica*, a remedy capable of immediately producing this effect in a fenfible degree, without at the fame time occafioning other great and important changes in the fyftem. Opium, the author found to increafe the number of pulfations, though the contrary has been very lately affirmed. The digitalis has the property of reducing the pulfe, but at the fame time it excites fo much general difturbance in the fyftem, that it is better to let the pulfe remain as it is, than to reduce it at fuch a price. It renders the pulfe, likewife, irregular, inftead of fimply reducing its frequency. Upon the whole, the author obferves with regard to this plant, that its diuretic powers are not fo certain as has been fuppofed, and that it is little adapted to general and extenfive ufe in medicine.

The warm bath, therefore (85° to 96°), is the only remedy we are at prefent in poffeffion of that has the property of immediately retarding the velocity of the pulfe, and that without inconvenience in the generality of cafes. In a variety of acute affections this remedy may be had recourfe to with advantage. Its ufe in this refpect, indeed, is very antient. *Hippocrates* fpeaks of it in many parts of his works. *Galen*, *Celfus*, *Cœlius Aurelianus*, and others, fpeak of it in terms of commendation in febrile difeafes; but principally in thofe of the intermittent clafs.

Befides the employment of the warm bath in acute difeafes, for the purpofe of alleviating certain fymptoms as abating pain, obviating fpafm, and the like, and for which it is not unfrequently prefcribed, the

author ſpeaks highly of its uſe in the ſmall pox, particularly during the eruptive fever, which, he ſays, it manifeſtly leſſens, and conſequently diminiſhes the future danger and ſeverity of the diſeaſe. In caſes where the diſeaſe is complicated with the ſtate we call nervous fever, accompanied with depreſſion of ſtrength and torpor, he thinks it may prove injurious. The uſe of this remedy in other acute diſorders muſt be governed by the ſame principles.

In many chronic affections, the warm bath is equally ſerviceable. In hydropic ſwellings, however, the author obſerves, it is contra-indicated: and 'it would be folly,' he remarks, 'to preſcribe it to a phthiſical ſubject, notwithſtanding it reduces the fever for ſome hours: the advantage thus gained would be inſignificant, and we ſhould riſk thereby increaſing the diſpoſition to hydropic ſwelling, and the ſweats.'—The reader will recollect the contrary opinion of a late writer on this point.*

In general it would ſeem, that the warm bath is ſerviceable in caſes where the pulſe is preternaturally quickened, with or without general debility. The opinion of the author with regard to this remedy may be in great meaſure gathered, from his conſidering it as oppoſed, in its mode of action, to wine and other ſtimulants.

The 7th chapter treats of the action of the warm bath in pains, ſpaſms, and in inducing ſleep. Its effects in this way are pretty generally underſtood. Much ingenious reaſoning is employed by the author to prove that the bath operates on the nervous ſyſtem, and, through the medium of this, on the blood-veſſels: but our limits prevent us following him here.

Chap. 9 treats of the effects of the warm bath on the fluid parts of the body, and on the veſſels which

* See page 353 of our laſt Volume.

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contain them; in other words, of abſorption and perſpiration during the time of bathing. It is impoſſible, the author obſerves, to determine with preciſion, by any experiments, how much the human body perſpires in general, or how much it abſorbs from the atmoſphere. Theſe two functions differ eſſentially in different individuals, and in the ſame, at different times, and in different circumſtances. And, which is here of the greateſt importance, the perſpiration by the ſkin, and the exhalation from the ſurface of the lungs, prevent our knowing how much is received by abſorption; whilſt, on the other hand, the abſorption prevents all calculation of the loſs ſuſtained by perſpiration.

In the opinion of the author, the warm bath has leſs influence over the perſpiration than it has over the abſorption of the body. He conſiders the inſenſible perſpiration as of much greater importance in the ſyſtem than many modern phyſiologiſts imagine: both this and the *humoral pathology* in general, he conceives to be too much neglected by phyſicians at preſent. It is certain that the perſpiration is increaſed in the bath, and that the abſorbing veſſels introduce water into the maſs of fluids in circulation. It is equally beyond a doubt, that many of the effects of bathing are derived from thence, though it is difficult to ſay preciſely what theſe effects are. One of them, M. *Marcard* ſuppoſes, may be, that of retarding the approach of old age, by ſoftening and relaxing the rigid fibres, and thus reſtoring the permeability of the minute veſſels, a great number of which become obliterated as life advances. The water abſorbed, likewiſe, in its paſſage through the lymphatic veſſels and glands, may remove obſtructions exiſting there. The author has had occaſion to obſerve, in three inſtances, that the glands of the neck in children ſwelled much after bathing; and an eruption on the face followed, but without any unpleaſant ſymptom.

 Chap. 9.

Chap. 9. *Of ſome other effects, real or pretended, of bathing on the body.* Amongſt the minor effects derived from bathing, and which are advantageous, the author enumerates cleanſing the ſkin from impurities of different kinds, and the renewal of the epidermis or ſcarf-ſkin. The preſſure of the water on the ſurface of the body, alſo, may produce ſome effect, particularly on the reſpiration, which is performed with rather more labour than before: this, however, is not conſiderable.

Chap. 10. *Of the Hot Bath* (97° and upwards.)

Chap. 11. *Of the Vapour Bath.* Of theſe the author can ſpeak little from his own experience. We ſhall, therefore, not dwell on them. Of the former, he obſerves in general, that it is always an active remedy, and, according to the degree of heat, ſometimes violent and dangerous, inducing irritation, fever, and apoplexy. The *vapour bath* is particularly recommended in caſes of rheumatiſm and gout, and for the purpoſe of exciting ſweating, when this evacuation is requiſite.

The 12th and laſt chapter treats of the *Cold Bath*; ranging from 32° to 85°. This the author again divides into the *cold*, from 32° to 65°; and the *cool (frais)*, from 65° to 85°. The cold bath, M. *Marcard* obſerves, is often very improperly preſcribed by many, as if it was indiſcriminately applicable to every kind of weakneſs; which is by no means the caſe.

The immediate and ſenſible effects of the cold bath are deſcribed with much accuracy and minuteneſs. It is to be regretted, however, that the effects on the pulſe have not been aſcertained by the author himſelf, and particularly becauſe the remarks of writers on this point are very contradictory. He thus endeavours to explain the effects produced by the cold bath on the body. All of them, he obſerves, may be properly reduced to the ſubtraction of heat; and admitting cold

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to be a negative quality merely, it is impoffible to entertain a different opinion. The cold bath operates this fubtraction with violence; and thence its energy: the *cool* bath effects the fame thing with lefs activity and fuddennefs, and is on this account milder in its operation. This fubtraction of heat in the organ of feeling is *difagreeable*; hence is derivable the unpleafant fenfation that takes place, without the neceffity of admitting an active irritant. The organs of motion, whatever they be, that probably act in retaining or keeping up the heat, are put into action to repair the lofs; hence the movements more or lefs confiderable, in proportion to the heat loft, or to the rapidity of the action which carries it off; hence, too, the fhaking, the contractions, &c. The fympathy or *general confent* of the body acts freely during this time. The expanfion of every body is diminifhed according to its deprivation of heat; hence the rigidity of the fibres, the contraction of veffels, and the diminution of volume in the fluids. At the commencement of the cold bath, its action is confined to the furface, but it fucceffively and gradually carries off a part of the heat of the fyftem generally; from hence arifes a diminution of motion and feeling, functions which cannot exift without the prefence of heat, and which become annihilated by a total fubtraction of this principle. Laftly, the increafed denfity, the hardnefs and roughnefs of the fkin covering the parts moft immediately expofed to the cold, are to be confidered as effects produced by it, which ferve at the fame time to leffen its impreffion. Here, as in many other inftances, we obferve in the effects themfelves a remedy for the evil it produces.

The author treats but briefly of the beneficial effects of the cold bath, and its application in certain cafes of difeafe; thefe, as he remarks, are pretty well underftood. The injurious confequences, however, which may arife from the cold bath in many cafes, are lefs

attended to by practitioners. It may be hurtful, he obſerves, in the following reſpects: 1. By the property it poſſeſſes of driving the fluids from the ſurface to the interior, thus deſtroying the balance of the circulation, and diminiſhing the natural excretions on the external parts: 2. By its effects on the nerves and fibres, by which the organ of feeling is irritated, and a ſhock communicated by ſympathy or conſent to the whole ſyſtem. On this account it may be injurious in caſes of great nervous ſenſibility and irritability, occaſioning convulſions and even epilepſy, according to the teſtimony of the beſt writers: 3. The cold bath may be hurtful in caſes of extreme weakneſs of the whole ſyſtem. The moſt certain ſign of the cold bath being injurious, is a ſhivering experienced on coming out, and eſpecially a difficulty, after ſome time, of recovering the loſt heat of the body. When this is the caſe, the cold bath produces weakneſs rather than ſtrength. 4. It may be hurtful, by its property of contracting the fibres and veſſels. Hence, the author ſuppoſes, the external veſſels loſe too much of their capacity, in relation to the internal. In topical affections of the internal parts, therefore, as of the lungs or other viſcera, and in moſt acute diſorders, the cold bath ſhould be abſtained from.—At the time he wrote, the author was not acquainted, we preſume, with the experiments of Dr. *Currie* on this ſubject.*

The work is concluded by ſome general remarks on the habitual uſe of the cold bath (from which the author diſſuades), and on the particular methods of employing it. Theſe are probably of importance on the continent, where this ſpecies of bath is little uſed, and its effects leſs underſtood.

* For the effects of cold bathing in fever, the reader may conſult our account of Dr. *Currie*'s valuable Treatiſe on the ſubject. Vol. 4, p. 401.

MISCEL-

MISCELLANEOUS INFORMATION.

On the Natural Hiſtory of Southern Africa, &c.

SKETCHES *of the Natural Hiſtory of Southern Africa and its Inhabitants.* (*From* Travels into the interior of Southern Africa, in the years 1797 and 1798. By *J. Barrow.*)

This country affords a rich harveſt to the zoological and botanical traveller, abounding with the greateſt variety of plants and animals. 'Of the ſeveral kinds of ſnakes that they here enumerate, one only was conſidered as innoxious; this was the *boom ſlange*, or tree ſnake, ſo called from its being generally found coiled round the branches of trees; it is from ſix to ten feet in length, very thick, and of a dark ſteel-blue colour approaching nearly to black. It is ſaid to take up its abode in trees for the ſake of procuring its food with the greater convenience, which in general conſiſts in the ſmaller kinds of birds. The faſcinating power aſcribed to certain ſnakes of drawing animals within their reach by fixing their eyes upon them, or by ſome other means, has often been remarked, and as often been diſbelieved. When a fact is mentioned of ſo extraordinary a nature that the generality of mankind could not have obſerved it, individual teſtimony is not always of ſufficient force to eſtabliſh general belief. In the Southern part of Africa, where ſnakes are every where met with in great abundance, the fact with regard to their faſcinating power over birds is ſo well known, that very few of the peaſantry will heſitate to vouch for the truth of it from perſonal obſervation; but I have never heard it ſuppoſed here that the influence of the charm was extended to the human ſpecies, as has been aſſerted, ſeemingly on good authorities, to be the caſe in parts of Aſia and

North America. The moſt formidable ſpecies of this venomous tribe of animals in the colony of the Cape is the hooded ſnake, which they call the *cobra capella*. The Hottentots are acquainted with ſeveral vegetable antidotes againſt the poiſon of ſerpents; but the moſt approved remedy among the Dutch is the *ſlange ſteen*, or ſnake ſtone, which they hold to be infallible. This is nothing more than a piece of firm bone of ſome animal made into an oval ſhape, and burnt round the edges ſo as to leave a whitiſh ſpot in the middle. The country people, who purchaſe this remedy under the idea of its being a ſtone taken out of the head of a certain ſpecies of ſerpent, were very much aſtoniſhed on being told that it was only a piece of bone; and the more ſo on finding this ſubſtance ſtood their teſt of the goodneſs of *ſlange ſteen*, which was that of throwing out bubbles on the ſurface when immerſed in water. To the poroſity of the bone may be aſcribed its healing qualities, if it actually poſſeſſes any; for which reaſon any other ſubſtance made up of capillary tubes, as common ſponge for inſtance, might produce the ſame effect.'

The manners and mode of life of the Hottentots, a race leſs ſavage than is commonly repreſented, are here curiouſly pourtrayed by the author. 'They are by no means,' Mr. *Barrow* obſerves, 'deficient in talent, but they poſſeſs little exertion to call it into action. The indolence of a Hottentot is a real diſeaſe, whoſe only remedy ſeems to be that of terror. Hunger is inſufficient to effect the cure. Rather than have the trouble of procuring food by chaſe, or of digging the ground for roots, they will willingly faſt the whole day, provided they may be allowed to ſleep. Inſtances frequently occurred in the courſe of our journies, when our Hottentots have paſſed the day without a morſel of food, in preference of having the trouble to walk half a mile for a ſheep. Yet, though they are ſo exceedingly patient of hunger, they are at the ſame time the greateſt gluttons upon the face of the earth. Ten of

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our Hottentots ate a middling-ſize ox, all but the two hind legs, in three days; but they had very little ſleep during the time, and had faſted the two preceding days. With them the word is to eat or to ſleep. When they cannot indulge in the gratification of the one, they generally find immediate relief in flying to the other. Their manner of eating marks the voracity of their appetite. Having cut from the animal a large ſteak, they enter one edge with the knife, and paſſing it round in a ſpiral manner till they come to the middle, they produce a ſtring of meat two or three yards in length. The whole animal is preſently cut into ſuch ſtrings, and while ſome are employed in this buſineſs, and in ſuſpending them on the branches of the ſhrubbery, others are broiling the ſtrings coiled round and laid upon the aſhes. When the meat is juſt warmed through, they graſp it in both hands, and, applying one end of it to the mouth, ſoon get through a yard of fleſh. The aſhes of the green wood that adhere to the meat ſerves as a ſubſtitute for ſalt. As ſoon as a ſtring of meat has paſſed through their hands, they are cleaned by rubbing over different parts of their body. Greaſe thus applied from time to time, and accumulating perhaps for a whole year, ſometimes melting by the ſide of a large fire, and catching up duſt and dirt, covers at length the ſurface of the body with a thick black coating that entirely conceals the real natural colour of the ſkin. This is diſcoverable only on the face and hands, which they keep ſomewhat cleaner than the other parts of the body, by rubbing them with the dung of cattle: this takes up the greaſe, upon which water would have no effect.'

This ſmearing of the ſurface of the body with rancid and filthy ſubſtances, is not, as might have been expected, productive of any ill effects; on the contrary, the author ſeems to conſider the practice as preventive of that diſguſting and dreadful diſorder, the elephantiaſis. The Hottentots, he obſerves, know nothing of

ſuch

ſuch a complaint; nor did he perceive that any kind of cutaneous diſeaſe was prevalent among them.

It does not appear that the Hottentots are ſubject to any particular diſeaſes. Life, if not taken away by accident or violence, is generally terminated by a gradual decay and exhauſted nature, which generally happens at an earlier period of exiſtence here than in moſt countries of an equal temperature of climate. It is rare to ſee a Hottentot with ſixty years upon his head; but it is alſo equally rare to ſee a cripple or deformed perſon among them. There are none who profeſſedly practice the healing art; every one is his own phyſician. The coloniſts, in this reſpect, are no better ſerved than the Hottentots. In the whole diſtrict of *Graaff Reynet* there is but one apothecary, and his reſidence is at the Droſdy.

The *Kaffers* are another nation inhabiting the country in the neighbourhood of the Cape, and exceedingly diſſimilar in their manners and appearance from the other people of Southern Africa. The author does not conſider them as indigenous to the ſpot they inhabit, but as probably of Arabian origin, and ſprung from ſome of the tribes of thoſe wandering Arabs known by the name of *Beduins*. Circumciſion of male children, that grand feature of Iſlamiſm, is univerſally practiſed among the *Kaffers*, and is the only exterior mark that ſeems to remain of a religious or ſacred inſtitution. He conſiders it, however, in the limited point of view of a duty owing to the memory of his anceſtors, a preſcriptive cuſtom handed down to him as an example he is bound to follow. He neither aſcribes the practice of it to a principle of cleanlineſs, nor to any other cauſe or motive, but contents himſelf by pleading antient uſage. A circumciſor is a profeſſion, and I believe the only one that exiſts among the Kaffers. The time of performing the operation is generally at the age of eight or nine years. The peo-

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ple who follow the profeſſion travel from village to village, cutting all the male children who may be of a proper age. During the time he remains in a village, which may be eight or ten days, to ſee that his patients are doing well, he is feaſted from houſe to houſe. To perform the operation nothing more is neceſſary than a ſharp piece of iron in the form of the blade of a knife. The point of this is inſerted between the glans and the prepuce on the upper part, and the ſkin laid open to the root where they unite; from thence the inſtrument is paſſed down each ſide to the frœnum, cloſe along the edge of which the whole prepuce is removed in two parts. After the operation, the boy adopts a ſmall bag of leather which extends a little beyond the glans penis, and fits ſufficiently tight to remain on without binding, though ſome wear a belt, to which the covering is attached by a ſtring. The projecting end of the purſe has a ſmall ſhank about an inch in length, by which it may more conveniently be drawn off: this, with the rings, and beads, and other ornaments, conſtitutes the whole of a Kaffer's ſummer dreſs.

'The temperate manner of living among theſe people, their ſimple diet, and their duly proportioned quantity of exerciſe, ſubject them to few complaints. A limited number of ſimples compoſe the diſpenſary of all nations where phyſic is not a profeſſion. The Kaffers make uſe of very few plants, and theſe chiefly in embrocations for ſprains and bruiſes. The mother of Gaika was ſo ſolicitous to procure from us a quantity of common ſalts, to be applied as a purgative, that ſhe ſent a perſon to our waggons, fifteen miles diſtant, for it. They are not ſubject to any cutaneous diſeaſes. The ſmall pox was once brought among them by a veſſel that was ſtranded on their coaſt, and carried off great numbers. The marks of this diſorder were apparent on the faces of many of the elder people. They have no fermented or diſtilled liquors to impair the conſtitution. The only two intoxicating articles of which

which they have any knowledge are tobacco and hemp. The effects produced from ſmoaking the latter are ſaid to be fully as narcotic as thoſe of opium. In the uſe of this and of tobacco, the oriental cuſtom of drawing the ſmoke through water by means of the hookar, though in a rude manner, is ſtill retained.'

A curious inſtance is related of the effect produced by the application of the *oil of tobacco* to the mouth of a ſnake. 'One of theſe reptiles, about two feet in length, and of a bluiſh colour, had coiled itſelf five or ſix times round the body of a lizard. As I was endeavouring to ſet at liberty the captive animal, one of the Hottentots took out with the point of a ſtick, from the ſhort ſtem of his wooden tobacco pipe, a ſmall quantity of thick black matter, which he called tobacco oil. This he applied to the mouth of the ſnake while darting out its tongue, as theſe creatures uſually do when enraged. The effect of the application was inſtantaneous almoſt as that of an electric ſhock. With a convulſed motion, that was momentary, the ſnake half untwiſted itſelf, and never ſtirred more; and the muſcles were ſo contracted, that the whole animal felt hard and rigid, as if dried in the ſun. The Hottentots conſider the oil of tobacco among the moſt active of poiſonous ſubſtances; but it is never applied to the points of their arrows, being probably of too volatile a nature to retain its deleterious quality for any length of time.'

On the Preparation of Engliſh Opium. (From Tranſactions of the Society of Arts, &c. for the year 1800.

In a former volume of our Review, we mentioned the ſuccesſsful cultivation of the poppy in this country, for the extracting its juice, and converting it, by inſpiſſation, into a ſpecies of opium, fully equal in its powers, according to the teſtimony of different practitioners, to that imported from abroad.* Since

* Vol. 4, p. 114.

that

that period, the ſubject has been purſued on a ſcale of conſiderable magnitude by Mr. *Thomas Jones*, of *Fiſh-ſtreet Hill, London*, who laſt year obtained the Society's medal for preparing the greateſt quantity, not leſs than twenty pounds weight, of *opium*, from poppies grown in Great Britain, and equal in quality to the beſt foreign *opium*. This gentleman, alſo, has cultivated the rhubarb plant with ſo much ſucceſs, as leads to the hope of a foreign ſupply, after a few years have elapſed, being no longer neceſſary to us.

Mr. *Jones*, in the paper alluded to above, points out his particular method of cultivating the poppies, and of extracting their juice, by a proceſs extremely ſimple, and very eaſily practiſed. 'Having a tap-root,' he obſerves, 'their size will conſequently be proportionate to the depth of earth they are enabled to penetrate; hence the neceſſity of land that will admit of deep ploughing. The fineneſs of the ſurface, too, is very eſſential. As the ſeed is ſo ſmall, and the plants, on their firſt coming up, ſo exceedingly tender, the buſh-harrow ſhould always be uſed after thoſe that are commonly employed. By this means, a greater number are likely to vegetate, and their roots being better protected, are leſs liable to injury.

'Poppies (and when I uſe this name, I mean that particular kind before ſpecified, *papaver hortenſe*) may be cultivated both by the drill and broad-caſt mode of huſbandry; at the ſame time it muſt be remembered, that the land for each requires a different diſpoſition. In the former this is not ſo material, the ſowing machine regulating the diſtances of the rows according to the will of the operator: theſe ought to be nine inches or a foot aſunder, and in beds containing four rows, allowing a foot and half between each. But, with reſpect to the latter, this point muſt be ſtrictly attended to: the ridges ſhould never exceed four feet in breadth; ſo that the furrows will anſwer the double purpoſe of preſerving the land throughout the winter, and

and in the ſeaſon for collecting the opium, ſerve as paths for the workmen.

'Beſides two chances of a crop, I am decidedly in favour of autumnal ſowing; and the firſt week in September ſeems to be the moſt favourable period for this purpoſe. If the weather continues open, they will make ſuch a progreſs as to be capable of reſiſting the ſeverity of an inclement winter, without, on the other hand, being too forward; a circumſtance highly dangerous, as the firſt ſevere froſt is inevitably deſtructive.

'On this account, whether by the drill or otherwiſe, a larger proportion of ſeed ſhould be ſown at this ſeaſon, for the plants will defend each other; and as all the plants will not be equally forward, ſo, let the winter prove as it may, provided the ſeed has vegetated freely, there will be great probability of a good appearance in ſpring. If unfortunately, however, ſuch a winter as the laſt ſhould again occur, and the whole plantation fail, a circumſtance which has happened to myſelf, the ſpring ſowing ſhould not be deferred longer than the firſt week in March.

'I do not, without ſufficient reaſon, recommend that this operation ſhould be performed in autumn. The poppies are not only generally larger, but even, when this is not the caſe, I know from experience that they will yield a much larger proportion of opium: for it ſeldom happens that a ſpring poppy will bleed, as we term it, more than twice, while the others will bear ſcarifying till they are nearly ripe. This I imagine can only ariſe from the length of time the one has been in the ground in compariſon with the other. Indeed, the difference is ſo trifling, that, if the preſent winter deſtroys my plants, I ſhall be almoſt tempted to diſpoſe of my ſpring-ſowing to other purpoſes. In drilling, the neceſſity of covering the ſeed by harrowing is ſuſpended by the operation of the machine; and in the broad-caſt method, a ſhower of rain will have all the effect without further trouble or expence.

'Excepting

'Excepting great additional care, turnip and poppy hoeing are ſimilar, and in every reſpect may be conducted in the ſame manner. I believe the turnips are rather benefited, they certainly are not injured, by being ſhaken, and will recover from the effects of a wound; but if the poppies are accidentally touched, they will either exhauſt themſelves by bleeding, or dwindle ſo as to be of no value. But it is high time to proceed to the laſt point I propoſed to conſider, namely, the production and preparation of opium.

'In ordinary ſeaſons, the heads or capſules of autumnal poppies will be large enough for our purpoſe in the month of June; for at this time they will have attained half their growth, or be equal in ſize to a ſmall tea-cup. I have invented a variety of inſtruments as ſcarificators; but as only two kinds were actually uſed, I am unwilling to trouble the Society with a deſcription of any other.*

'Seven, and ſometimes eight, boys were employed, from eight to twelve years of age, together with a man as a ſuperintendant. The children's book, which accompanies the inſtruments, contains only an account of ſix, as the eldeſt, being the ſon of my gardener, is included in another book. To the youngeſt I gave three pence per day, and, if tractable and well diſpoſed, an additional penny for every additional year.

* 'The firſt of theſe inſtruments conſiſts of two thin ſteel blades fixed by a wedge in a wooden handle, ſo as to make inciſions one fourth of an inch from each other. The other is made entirely of ſteel, and reſembles in form the tuning-fork of an harpſichord. It conſiſts of four bars, proceeding from a handle of a convenient length, a quarter of an inch wide, and two and a half long, each terminating in a bolſter, through which a ſcrew paſſes that fixes the ſcarificators. The centre bars ſhould be ſo elaſtic as to yield to the curvature of the capſule, upon the outer ones being preſſed by the finger and thumb; and by this means four inciſions are made at once, at equal diſtances. This inſtrument is an inch and three quarters in width; but from the two outer blades, only an inch and a quarter The bolſters are a quarter of an inch in diameter, and the ſcarificators a proportionate length, namely, three eighths. The wedge in the former, and a longitudinal aperture in the ſcarificators, or blades of the latter, will regulate the depth of the inciſions, at the will of the operator. It is of the utmoſt importance that theſe ſhould not be made through the inner coat of the capſules.

'The

'The ſteel inſtrument was uſed by the latter, and the others by the former. I have great reaſon to be ſatisfied with their conſtruction; for, notwithſtanding their ſimplicity, they proved themſelves fully equal to my purpoſe; and ſo conſiderable a trial has not ſuggeſted any other improvement, than that in the largeſt the two inner bars only ſhould be elaſtic; for the continual preſſure of the finger and thumb on the two outer ones, which is abſolutely neceſſary for the others to act, would be avoided, and, conſequently, much fatigue and inconvenience prevented.

'It is of very little conſequence whether the firſt inciſions are made horizontally or vertically with this inſtrument, for however luxuriantly the milk may flow, by making four at one time, it ſo divides the ſtream that ſeldom any eſcapes. With the ſmaller ones we moſt commonly made them horizontally, beginning as near the top of the head as poſſible, and for this reaſon:—all the juices, if the firſt inciſion was made at the bottom, would be naturally attracted by the aperture, and render every other completely fruitleſs, beſides occaſioning the certain loſs of a conſiderable quantity, by falling on the ſurrounding leaves; whereas, on the other hand, a proportion of milk will exude from each, and the opium be equally diſtributed over the whole ſurface of the head.

'No particular directions ſeem neceſſary for repeating this operation, any further than that each time it ſhould be performed in a contrary direction, and continued till no more will exude, at intervals of four or five days or more, according to circumſtances; for, as the weather proves rainy or fair, they will be ſhorter or longer, the heads being ſooner repleniſhed in the one than the other.

'Each of the children being provided with a tin cup, having one handle ſo contrived as to fix itſelf to a girdle faſtened round his waiſt, with a common gardening knife they ſcraped off the opium that appeared upon the heads in a ſoft aſh-coloured ſubſtance.

Dewy

Dewy mornings are beſt calculated for this purpoſe, and it ſhould be diſcontinued ſo ſoon as the ſun has gained a ſufficient power to diſſipate it; for, if perſevered in throughout the day, ſome of the opium will recede into the interſtices, and more, in defiance of every endeavour, will remain upon the heads. The principal quantity exudes in the courſe of the night, and, uniting with the dew, it is taken off as readily and completely as with a ſponge.

‘ Several regulations were adopted to excite, as much as poſſible, a ſpirit of emulation. The name of each boy was written on his cup, ſo as to aſcertain, on their return from collecting, who had been the moſt active. And although, in conſequence of the unſettled ſtate of the weather, this part of our proceſs continued ſo long as from the 6th of July to the ſecond week in September, incluſive, the good effects were felt to the laſt. And as, for the reaſon already mentioned, an hour in the morning became ſo invaluable, thoſe who appeared in the ground at five o'clock, at the moſt buſy period, became entitled to an additional penny to their daily pay. This meaſure ſucceeded only with a few; but the remainder, overcome by ſhame, at length attended equally well. In addition to this encouragement, I am under an engagement (in caſe I ſucceed with the Society), to ſuch whoſe behaviour has been uniformly good, to celebrate the circumſtance by a public dinner.

‘ The interval from breakfaſt time to ſun-ſet, if the weather aſſumed a ſettled appearance, was occupied by ſcarifying. And here I again felt the good effects of ſtimulating meaſures: certain places were allotted to particular children, according to their ability, ſo as to diſcover who ſcarified the moſt and the beſt: the ſuperintendant occaſionally following all of them, to obſerve whether any work was left unfiniſhed, and, if there were any, to complete it. If, in our progreſs, any one proved refractory, which happened in more inſtances than one, rather than have recourſe to ſeverity,

and for the ſake of example, he was immediately diſcharged. I had numerous applications, and the firſt on the liſt always had the preference as his ſucceſſor.

'Upon the whole, conſidering it was the firſt attempt of the kind, every thing proceeded very regularly; and had the ſummer been propitious, notwithſtanding my former diſappointments, I ſhould have had great cauſe for ſatisfaction. The largeſt quantity that my man, ſeven children, and myſelf, were able to procure in one morning, from five to nine o'clock, was one pound and a half: this happened when the dew was remarkably great, and ſucceeded one of the warmeſt days in ſummer.

'From the experience I have had, the precariouſneſs of our climate appears to be the only obſtacle to the production of opium in this kingdom. It may be ſaid, that the ſame inconvenience attends every other agricultural purſuit; and that hay, and a variety of productions, particularly hops, are much prejudiced from the ſame cauſe. I allow that they are ſo; but the evil produced by a ſudden alteration in this caſe is irreparable; for, ſhould it happen after a fine ſcarifying day, we do not only loſe the labour of that day, but all its produce. It becomes obviouſly neceſſary, therefore, to be particularly circumſpect; and this is the only remedy we are able to procure. The poppies will receive no damage from remaining entire, while, on the other hand, impatience may be injurious, if not deſtructive.

'As my notes furniſh me with no further particulars, I have very little more to add. The opium, when firſt collected, from its union with the dew, is much too ſoft to be ſo formed as the Society will receive it.

'To reduce it to a proper conſiſtence, taking nature for our guide, it ſhould be thinly ſpread in ſhallow diſhes, and expoſed, under glaſſes, to the rays of the ſun. My opinion is, that Turkey opium ſuffers conſiderably from the operation of fire: certain it is, that with reſpect to its effluvia, it undergoes a complete

alteration.

alteration. I have covered it with its own leaves, thinking this a very convenient mode of package, and conceiving it to be important, in every new undertaking, by ſtudying appearances, to yield to the general prejudices which naturally prevail in favour of the article to which we have been accuſtomed.'

Reſpecting the quantity of opium procurable in this way, the author obſerves, that the heads, upon an average, large and ſmall, ſeem to have yielded three fourths of a grain each.

As no improper ſupplement to the above, we preſent our readers with the following " Account of the Growth and Preparation of Opium in the Province of *Malava*, in the *Eaſt Indies*." (From *Aſiatic Reſearches*, vol. 6.)

' The poppy is ſown in December. The ground is well manured with cow-dung and aſhes. It is ploughed ſeven times, then divided into little ſquares, of two or two and an half cubits; in theſe the ſeeds are ſown in the proportion of one ſeer * and an half, or two ſeers to a begah. † After eight or nine days, the ground is watered; that is, it is completely overflowed to the depth of a few fingers breadth, and this operation is repeated, at the diſtance of ten or twelve days, for ſeven times. After each time of watering, when the ground is a little dried, but ſtill ſoft, it is ſtirred, with an iron inſtrument, ſo as to looſen it effectually, and the weeds are carefully removed. Alſo if the plants come up very cloſe, they are thinned, ſo that the remainder may be at the diſtance of four or five fingers breadth from one another. The plants thus pulled out, when very young, are uſed as a pot-herb; but when grown a little larger, as a foot and a half in height, are unfit for this uſe, from their intoxicating quality.

* The *ſeer* is 80 rupees weight. † 100 cubits ſquare.

‘ The poppy flowers in *February*, and the opium is extracted in *March* or *April*; ſooner or later, according to the time of ſowing. The white kind yields a larger quantity of opium than the red; the quality is the ſame from both. When the flowers are fallen off, and the capſules aſſume a whitiſh colour, it is the time to wound them. This is done by drawing an inſtrument with three teeth, at the diſtance of about half a line from one another, along from top to bottom of the capſule, ſo as to penetrate the ſkin. Theſe wounds are made in the afternoon and evening, and the opium gathered the next morning. They begin at day break, and continue till one p'har of the day is passed. The wounds upon each capſule are repeated for three ſucceſſive days; the whole capſules in a field are wounded, and the opium gathered in fifteen days. In a plentiful ſeaſon and good ground, they obtain from ſix to nine ſeer of opium from a begah of ground: a ſmall crop is from two to four ſeers.

‘ In this diſtrict, all the opium, even at the time of gathering, is mixed with oil; and this they do not conſider as a fraudulent adulteration. The practice is avowed, and the reaſon aſſigned is, to prevent the drug from drying. The people employed in gathering it have each a ſmall veſſel containing a little oil of ſeſamum, or of lintſeed. The opium which has flowed from the wounded capſules, is ſcraped off with a little iron inſtrument previouſly dipped in oil. A little oil is taken in the palm of the hand, and the opium gathered with the iron inſtrument is wiped in the hand, and kneaded with the oil: when a ſufficient quantity is collected in the hand, it is thrown into the veſſel with oil. The whole quantity gathered is, when taken home, kneaded into a maſs, and thrown into a veſſel with more oil, in which the whole crop of the ſeaſon is collected. Thus, it is evident, that the portion of oil in any given quantity of opium is not determined with much accuracy; but they compute that

that the oil amounts to half the quantity of the pure drug, or one third of the mixed maſs.

'The adulterations practiſed ſecretly, and conſidered as fraudulent, are, mixing the powder of the dried leaves of the poppy, and ſometimes even aſhes.

'When cheap, it ſells for fifteen rupees; and when dear, or of a ſuperior quality, for twenty-five or thirty rupees per d'hiree, a weight of $5\frac{1}{4}$ ſeers, each ſeer being the weight of eighty rupees.

'It is exported to *Guzeret, Marwar,* &c. The merchants from different parts of the country advance money to the cultivator while the crop is on the ground: when the drug is ready they receive it, and ſettle the price according the quality and the ſeaſon. The plant is ſown repeatedly on the ſame ground without limitation; and they find that it does not exhauſt the ſoil.

'The mixture of oil renders this opium of a very inferior quality to that of the eaſtern provinces, and particularly renders it unfit for making a tranſparent tincture.'

The mode of preparing this drug, above deſcribed, differs in ſome reſpects from that which is practiſed in other parts of India.

Dr. *Hull,* of *Mancheſter,* announces his intention of publiſhing, immediately, a Tranſlation of M. *Baudeloque*'s Reſearches and Reflections on the Cæſarean operation; with the addition of a preface, notes, and an appendix; illuſtrated by ſix engravings.—— *Bickerſtaff, Strand.*

☞ Mr. *Perkins* muſt excuſe us from noticing in our Review his late collection of Teſtimonies in favour of the metallic tractors. Evidence of the ſort adduced may probably ſatisfy *patients*: our opinion on the ſubject has been already declared, and we have found no reaſon to alter it.

General View of the Progreſs of Medicine.

At no period of time has the art of medicine been ſo widely or aſſiduouſly cultivated, as at the preſent. Practitioners are not, as heretofore, content with tracing the footſteps of their precurſors in the field, but each one ſtarts aſide from the beaten track in purſuit of novelty; rummaging the ample ſtorehouſes of Nature for inſtruments of health (perhaps ſometimes of deſtruction too), and his own brain for hypotheſes, to enable him to pry into the ſecrets of Nature, to expoſe her mode of acting, and to detect her laws. Theſe excurſions, it muſt be confeſſed, have not always been crowned with the ſucceſs the intention merited. Nature is too coy to expoſe her hidden beauties to the gaze of every admirer. Something uſeful, however, will always ſtart, to reward the toil of diligent and patient reſearch. If we fail in reaching the utmoſt limits of our view, ſome progreſs at leaſt will be made towards it; a point may, perhaps, be attained from which our horizon is extended, and from which we may better trace the path that ſtill lies before us, and acquire freſh vigour to continue the purſuit. This, we truſt, will be found to be the caſe with the ſubject before us. Amidſt the variety of matters of which the preſent volume is compoſed, not a little will be found to mark the progress of our art, and the ſucceſsful diligence of its purſuers.

In taking a retroſpective view of medical literature for the paſt year, the ſubject of vaccine inoculation unqueſtionably holds the firſt place in the ſcale of real importance. Since the happy introduction of the variolous inoculation into Europe, in the beginning of the laſt century*, no ſubject in medicine has ſo widely and deſervedly attracted the notice of practitioners, and the public at large, as the artificial communication of the vaccine diſeaſe, for the prevention of ſmall pox. Within the ſhort period of a few months, as it were, the attention of all Europe has been rouſed, and the practitioners of different countries have vied with each other in inveſtigating the merits, and diffuſing the benefits, of the *Jennerian* inoculation, for ſo, in juſtice to the diſcoverer, it ſhould be termed. The inſtances of its ſucceſsful adoption are now become too numerous for calculation. There is at preſent ſcarcely a corner in the empire where the *cow pox* is not known, and its inoculation practiſed. In all the chief cities and towns of Europe it has been eagerly adopted: nor has America been backward in acknowledging its utility and importance. Even the ſemi-barbarous regions of Turkey promiſe to afford it an aſylum, into the capital of which it has been lately introduced by the *Britiſh* ambaſſador, Lord *Elgin*; Europe has thus a chance of acquitting herſelf of the heavy debt due to the Eaſt, for the benefits formerly received by the introduction of the variolous inoculation from that quarter of the world.

* The very curious fact, of inoculation having been very generally practiſed in South Wales, under the denomination of *buying* the ſmall-pox, from time immemorial, was noticed in a former volume of our Review (vol. 3, p. 494). It is equally curious, that the preventive power of cow pox, with regard to ſmall-pox, ſhould have been known to every villager in certain parts of the country, without having been applied in practice, or even known to the generality of practitioners.

The

The later experience of practitioners, at the ſame time that it ſeems to have confirmed and eſtabliſhed the firſt ſtatements of Dr. *Jenner* with regard to the vaccine inoculation, has diſcovered little that was before unknown on the ſubject. One or two facts, however, deſerve to be noticed. Its preventive power with regard to other diſeaſes, is not, it appears, confined to the human ſpecies, but is found to take place, alſo, in ſome other animals; as in dogs. This animal is liable to a diſorder extremely fatal to it, and which has been called, in common language, the *diſtemper*, an affection that has ſeldom been relieved by art. By inoculation with the vaccine virus, the dog is affected with mild febrile ſymptoms, which terminate ſpontaneouſly in two or three days; and it has been found, on many trials, that the animal is not afterwards ſuſceptible of the *diſtemper*.

Many circumſtances led to the ſuppoſition, that the cow pox and ſmall pox were originally one and the same diſeaſe; the latter being derived from the animal at ſome remote period, and having undergone, in the lapſe of years, and by the influence of various conſtitutions, the changes we now experience. Subſequent facts, however, tend to invalidate this concluſion. It has been obſerved at the Small Pox Hoſpital, that when the vaccine and variolous fluids are mixed together, and thus inſerted, ſometimes the vaccine puſtule, at others the variolous, has been produced, each of them retaining its characteriſtic marks throughout. Again, it has been found, that when the two fluids are inſerted ſeparately, and ſo near together that the two puſtules which follow ſpread into one, by inoculating with the fluid taken from one ſide of it, the vaccine puſtule alone will be produced, whilſt the fluid taken from the other excites the genuine variolous puſtule, with the general eruption of ſmall pox over the body. Another curious fact, to the ſame purpoſe, has lately occurred at the ſame place. An adult female was inoculated for the vaccine diſeaſe. Six days afterwards, the natural ſmall pox appeared, and two of the puſtules aroſe within the circumference of the vaccine pock. When theſe had maturated, the fluid taken from them was inſerted into another perſon, and produced the regular ſmall pox: at the ſame time matter was taken from the vaccine pock, at a little diſtance from the variolous puſtules, and gave the vaccine diſeaſe in its genuine form, without any eruption over the body. A drawing of this curious appearance has been made by Mr. *Wachſel*, the reſident apothecary at the hoſpital.

It appears, therefore, that the two diſeaſes are not ſuſceptible of intermixture, but that each preſerves its diſtinct character under all circumſtances.

Another point of diſſimilarity between the variolous and vaccine diſeaſes is this: the inoculation of the former, we know, very frequently ſuperſedes the natural diſeaſe many days after expoſure to infection. The vaccine pock appears to have little or no effect in retarding the progreſs of other eruptive diſeaſes, though it purſues its own courſe, at the ſame time, in a regular way. Thus if vaccine and variolous matter be inſerted at the ſame time, or within a week of each other, the vaccine pock goes through its regular ſtages, and the variolous puſtule on the arm, after exhibiting the uſual appearances, is ſucceeded by an

eruption of ſmall pox over the ſurface of the body. It appears from hence, that the preventive power of the vaccine diſeaſe is not exerted until its courſe be completed, or till the inflammation round the pock be on the decline. The exact time at which the action of the variolous virus is precluded, is not yet aſcertained ; but from ſome trials it appears probable, that its application after the ninth day will produce no effect.

When we conſider the numerous ineffectual attempts, amounting probably to ſome thouſands, which have been made to induce ſmall pox by inoculation, ſubſequent to the vaccine diſeaſe ; and the many expoſures to caſual infection which have in like manner purpoſely taken place, it is impoſſible not to admit the preventive power of the former with regard to the latter, for a certain period at leaſt after inoculation. On this head all practitioners are agreed, who have taken up the matter to any extent. Its permanently preventive power, it is plain, does not admit of proof equally ſatisfactory. A number of years muſt elapſe before this point can be determined to general ſatisfaction. Yet the evidence on this head is as ſtrong as could have reaſonably been expected. A great number have been found unſuſceptible of variolous infection, who were known at a former period of their lives to have undergone the vaccine diſeaſe ; whilſt the inſtances of the contrary are few, and ſome of theſe extremely queſtionable. It is remarkable, that all thoſe who have adopted the new practice, and who have had opportunities of carrying it to a conſiderable extent, at the ſame time that they are unanimous in their expreſſions of the ſafety and mildneſs of it, concur equally in admitting its power of preventing ſmall pox. And as many of theſe are above all ſuſpicion of miſrepreſenting things, and men of acknowledged diſcernment, it is reaſonable to infer, that the unfavourable reports which have now and then been made with regard to the vaccine inoculation, want that clear and deciſive evidence which entitle them to implicit credit, but which has been amply adduced on the other ſide.

It is exceedingly natural that an innovation of this importance ſhould encounter prejudice and oppoſition for a time from the public. This, we well know, took place at the introduction of the variolous inoculation, and was long in wearing away. In the mean time, it behoves *practitioners* at leaſt not to forward the tide of prejudice, as there is reaſon to fear has been the caſe, but rather to lend their aid, by obſervation and experiment, to bring the queſtion to a certain and ſpeedy iſſue.

Pulmonary Conſumption, which eſpecially promiſed to be benefited by *pneumatic medicine*, from its ready application to the affected parts, ſtill remains a monument of the weakneſs of our art. The different gaſes have too frequently failed of affording eſſential or even temporary relief, to warrant any very high expectations from this ſource. The advantages of employing the *Digitalis*, as an *anti-phthiſical* remedy, have been very highly vaunted by ſome; and a powerful agent of this deſcription is, no doubt, capable of producing effects of a very favourable kind. Practitioners in general, however, are not equally warm in their commendations of its utility. Whatever may be ſaid to the contrary, its effect in reducing the frequency of the pulſe is not conſtant, with

with whatever caution it be adminiftered. Sicknefs and vomiting, with other great derangement of the fyftem, are fometimes produced by it, without the quicknefs of the pulfe being at all abated.

It is of importance to remark, that the *Digitalis* does not appear to act immediately on the heart, reducing the quicknefs of its pulfation, and diminifhing the contractile power of the arteries: thefe effects are the refult of a previous operation on the brain; and hence the functions generally fuffer, as well as the circulating fyftem. Mufcular energy is impaired, often to an extreme degree; the appetite and digeftion are deftroyed, and the mental faculties deranged. The pulfe is not only rendered flower, but irregular, and often intermitting, marking the great diforder of the fyftem at large. Such are the effects of this active drug in the latter ftages of the difeafe; effects which tend to wear out, more rapidly than the difeafe itfelf, the fmall remaining ftock of life. In the earlier ftages, when the powers of the fyftem are lefs broken down, it promifes to be productive of effential advantage, by dimifhing the hectic fever, the moft diftreffing of the fymptoms, and that which appears to hurry on the patient to a fatal termination.

The utility of the *Nitrous Acid*, in the different forms of *Lues Venerea*, has of late received confiderable confirmation, by the teftimony of a great number of EaftIndia practitioners, as well as that of the furgeons of Woolwich Hofpital. The talents and opportunities of thefe gentlemen are too well known to fuffer us to queftion the accuracy of their ftatements. Yet, why the trials of furgeons in the metropolis fhould have led to conclufions fo very oppofite, is a problem not eafily to be folved. Further recourfe muft be had to experiment to fettle the merits of the queftion.

The treatment of Burns by ftimulating remedies, both external and internal, of the utility of which frefh proof has been brought forward by Mr. *Kentifh.* in the fecond edition of his Effay on that fubject, is be ranked among the ufeful innovations of the prefent day. The theory on which the author endeavours to fupport it is entitled to lefs attention, fince it would go to exclude a mode of practice apparently oppofite, but which, neverthelefs, has the fanction of experience in its favour. It is feldom that principles, as they are called, or rather hypothefes, in medicine are to be implicitly trufted to as a guide to practice.

The very curious remarks of M. *Hager*, of *Altenburg*, on the falling of the eyelids, and the indications and prognoftics thence arifing, will naturally attract the notice of practitioners. They are of fo novel a kind, and fo entirely defy all rational theory to account for them, that we fhall be anxious to fee a confirmation of them by other obfervers.—The late experiments on *Galvanifm*, of which we have given an account, are highly interefting, and tend ftill further to prove, that the phenomena are attributable to electricity, and not to a peculiar principle hitherto undifcovered. They fhew, at the fame time, that the laws of electricity are yet far from being fully inveftigated.——The painful fenfation felt, continuing as long as the communication is kept up between the extremities of the Galvanic pile, prove that there is a conftant circulation of the electric fluid taking place. The experiments feem to account, likewife, for the accumulation of electricity in the *torpedo, gymnotus electricus,* and other animals of this defcription. The

Galvanic

Galvanic pile, M. *Volta* remarks, has a much greater resemblance to the natural electric organ of these animals, than to the Leyden phial and common electric battery, being composed of conducting substances alone; active by itself without previous charge; acting without cessation, and capable every instant of giving shocks more or less strong; and, at length, inducing stupor of the affected limb. It is curious, that more pain is felt when the fluid is passing from the part, than in the contrary direction. The conjecture of M. *Robertson*, that the Galvanic phenomena are owing to the presence of an acid *sui generis*, appears to have little weight. The decomposition of water, and the liberation of its oxygen, sufficiently account for the appearances produced, in reddening the tincture of turnsol, and oxidating the metal.

The experiments of Mr. *Hatchett* on the nature of the solid parts of animals, as well as those of MM. *Guillot* and *Sage*, are well worthy attention. Chemistry is here in her proper sphere. When she soars to the higher regions of physiology and pathology, she is more apt to bewilder than to aid our pursuits:----" *Chymia egregia ancilla medicinæ, non alia pejor domina.*"

Amongst the labours of philosophers which are particularly deserving notice, must be mentioned those of Dr. *Herschell*, in investigating the properties of *heat* and *light*; principles which act so distinguished a part in the phenomena of Nature. The labours of Count *Rumford* in the same field are equally interesting. The laws which govern the elements in question are likely to meet an ample investigation from philosophers of this description. The subject of mineral waters owes much to the efforts of Mr. *Kirwan* and Dr. *Saunders*; they have, indeed, left us little more to wish for on this head. The subject of premature delivery, as preventive of the *Cæsarean operation*, as well as of *embryotomy*, is one of great importance. The experience of Mr. *Barlow* is a sufficient proof of the general safety of the practice.

Vegetable physiology has received much illustration from the pen of Dr. *Darwin*, in his highly interesting work, *Phytologia*. The distinction between the *astringent* and *tanning* principles, as pointed out by Mr. *Biggin*, and others, is likely to lead to practical consequences; since it has been observed by an ingenious foreigner, M. *Westring*, of *Norrkoping*, that those species of cinchona that contain the tanning principle in the greatest abundance are most powerful in the cure of agues, and that the *cinchona floribunda*, which contains scarcely any tanning matter, is destitute of the above medicinal property. The bark of the willow, which is more abundant in the tanning principle than even oak-bark itself, has been found to be eminently successful as a febrifuge and tonic remedy The *nitro-muriate* of tin, which has the same property of coagulating the animal juices, has been properly recommended for trial, as a medicine, by Mr. *Hatchett*.

We could easily point the reader's attention to a number of other articles worthy his notice; but our limits forbid. It is satisfactory to observe, that the wide diffusion of science at the present day, and its quick dispersion through the medium of periodical publications, stimulate the ardour of inquiry, and multiply the sources of knowledge in an incalculable degree. The amelioration of the condition of mankind, and a diminution of his stock of suffering, may hence be reasonably looked for.

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